Title

Industry attitudes towards and perceptions of an independent central procurement and supply chain function for MRO supplies.

By

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In the Faculty of Commerce

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30 November 2008

TO WHOM IT MAY CONCERN

RE: Permission for Submission

This research project has been reviewed by the undersigned and hereby permission is granted for submission for examination.

Sincerely,

_____

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DECLARATION

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This dissertation is being submitted in partial fulfilment of the requirements for the degree of Masters in Business Administration.

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STATEMENT 2

This dissertation is a result of my own independent work and investigation, except where otherwise stated.

Other sources are acknowledged by footnotes giving explicit references. A bibliography is appended.

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I hereby wish to express my gratitude to the following individual who enabled this document to be successfully completed

- Karen, who drove this project over a long time.

ABSTRACT

All manufacturing organizations have plants that require the provision of Maintenance, Repair and Operations (MRO) supplies in the manufacture of products. The appropriate and effective application of these concepts and principals contribute significantly to the effective and efficient utilization of plant assets and other resources within the manufacturing organization.

Components of the supply chain can be outsourced to third parties who with the correct focus, expertise and experience can realise strategic benefits for the manufacturing organization, allowing it to concentrate on activities that are core to its business.

It is necessary to determine the organizational buying centre's attitudes and perceptions to this concept in order to establish an independent third party Maintenance Repair and Operation (MRO) vendor.

The area of study is the Durban South area of Kwazulu Natal. Sample units of analysis were selected on a judgemental basis to ensure that different industrial sectors with different outsourcing experiences were represented. Data of a qualitative descriptive nature was collected.

The models employed provided a robust and constructive framework and by and large there was consensus between the research findings and the literature.

A key recommendation is that a mature and well disciplined environment within organizations and in their relationships with suppliers and collaborators is essential. Key further research is needed in the establishment of current and prospective future commonality of MRO stock items across different manufacturing organizations in the same geographical area.

Contents

CHAPTER 1 – INTRODUCTION AND OVERVIEW OF THE STUDY

1.1. Introduction

This chapter provides a brief introduction to the context, known literature, organizational problem, research methods, limitations, conclusions and recommendations of this research project.

1.2. Background to the Study

All manufacturing organizations have plants that require the provision of Maintenance, Repair and Operations (MRO) supplies in the manufacture of products. (Slack, Chambers and Johnston, 2004: 410)The use of supply chain and procurement concepts and principals are utilized in the provision of these MRO supplies. The appropriate and effective application of these concepts and principals contribute significantly to the effective and efficient utilization of plant assets and other resources within the manufacturing organization.

Strategic benefits to organizations include improvements to plant cost, utilisation, throughput, quality and flexibility. Efficient and effective supply chain practices target these benefits at many levels. (Johnson and Scholes, 2002: 161)

Components of the supply chain can be outsourced to 3rd parties who with the correct focus, expertise and experience can realise these benefits for the manufacturing organization, allowing it to concentrate on activities that are core to its business. (Johnson and Scholes, 2002: 332)

Large organizations with manufacturing sites in discrete geographical areas, with standard centralized systems and processes are able to offer economy of scale benefits to a potential third party MRO vendor.(Salvatore, 2001: 301)

A shared organizational vision can be employed in addressing risks and overcoming barriers to adoption of a new concept. (Hoyt and Hug, 2000: 5)

Operations and supply chain literature indicates that the attitudes and perceptions of organizational buying centres influence the decision to purchase and outsource services. (Boyson et al., 1999: 37) It is necessary to determine these attitudes and perceptions in order to establish an independent third party Maintenance Repair and Operation (MRO) supplies procurement and supply chain function.

1.3. Problem Statement

Independently owned single manufacturing sites in a common geographical area, find it difficult to achieve consensus and pool resources to achieve the economies of scale enjoyed by larger, more uniform organizations.

A third party MRO vendor concept (Figure 1) has been proposed by a United Kingdom based logistics service provider to Huntsman Tioxide in South Africa. This concept is set to realise supply-chain benefits and efficiencies in the procurement and supply of commonly used MRO supplies to independent manufacturing plants in a specific geographical area.

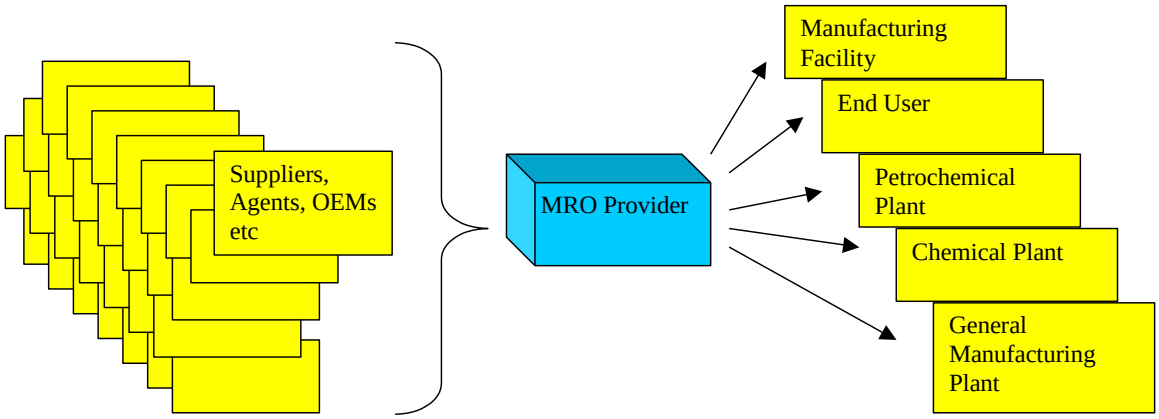

Figure 1. The Concept as adapted from: Huntsman Tioxide UK: 2000

The concept suggests that vendors who previously supplied each end user independently will supply into one delivery and procurement point – the third party MRO vendor.

Independent manufacturing plant MRO requirements will be supplied by the third party MRO vendor. The independent manufacturing plants will constitute the third party MRO vendor's customers and they are the focus of this study.

1.4. Objectives of the Study

The objective of the research is to determine industry attitudes and perceptions to the concept of an independent third party MRO supplier.

Secondary objectives are to gain contextual data of the sample units of analysis and observation to support conclusions that may be drawn.

1.5. Overview of the Study

The area of study is the Durban South area of Kwa-Zulu Natal. The population constitutes more than twenty sites in this geographical location. Sample units of analysis were selected on a judgemental basis to ensure that different industrial sectors with different outsourcing experiences were represented. Units of observation were drawn from opposing elements of the organizational buying decision making unit. The research time frame was single cross-sectional. Data of a qualitative descriptive nature was collected.

Data was obtained in a field study through eight in-depth personal interviews using a discussion guide.

Audio-recorded interviews were transcribed to Microsoft Word and Excel to facilitate analysis of the text.

The concept's perceived suitability for centralizing and collaborating on procurement and storage activities are assessed using the Van Weele (2002: 245) criteria. The industry attitudes to outsourcing these activities are assessed using Boyson et al's (1999: 93) Outsourcing Institute's reasons.

The models provided a robust and constructive framework to measure the attitudes and perceptions of a cross section of maintenance engineering, and procurement practitioners in respect of a proposed third party MRO concept. By and large there is consensus between the research findings and the literature.

A key recommendation is that a mature and well disciplined environment within organizations and in their relationships with suppliers and collaborators is essential for the implementation of the third party MRO vendor concept. Key further research is needed in the establishment of current and prospective future commonality of MRO stock items across different manufacturing organizations in the same geographical area.

1.6. Limitations

Due to the judgmental nature of the sampling and limited sample size, it is understood that a definite statement about the population may not be meaningful. However, this does not have a large impact on the objectives of the study. (Mouton, 2005: 148)

It was further understood that the data collection and analysis may be time consuming. (Mouton, 2005: 148). This proved to be true in arranging and conducting the interviews and in turn having these typed up.

Lastly the research and interviews were conducted prior to 2005 and may now be dated. The concepts referred to in the literature remain valid and as

the interviewer is still in contact with the interviewees it is believed that the views expressed are still relevant.

1.7. Conclusion

This chapter summarized the organizational problem, introduced some key literature on the topic, described the research methods and limitations then summed up the key conclusions and recommendations of the study.

CHAPTER 2 – VALUE AND SUPPLY CHAIN CONCEPTS

This chapter describes the role of value and supply chain concepts and principals in respect to Maintenance, Repair and Operation (MRO) supplies in the manufacturing organization.

In order to contextualize the role of MRO, this chapter is organized according to theme, exploring the constructs of the value system, value chain, supply chain, procurement and warehousing.

2.1. Value System

Many local manufacturing organizations have reached maturity and many customers consider their final product as a commodity. In many instances global capacity exceeds demand. Commodity demand increases can be below global GDP and prices, in real terms, are under pressure. Barriers to entry and exit in industry can be substantial when only a few main players may dominate an industry in an oligopalistic manner. Given these circumstances, the ability of any one organization to achieve competitive advantage over any of the other major players, is extremely difficult.

Building on the previous statement, channel partnerships have grown in response to the many market realities (Ross, 1998: 240). These include;

- A desirability of supplier relationships for competitive advantage
- The changing nature of the marketplace with use of third party and alliance suppliers; the integration of customers in the business development and the focus on core competencies.
- An increased demand for cost control, quality and innovation.
- An increased demand for risk sharing as the cost of innovation and operational flexibility diminishes and the window for profit shrinks.
- The enabling power of information and communications technology.
- A focus on continuous improvement.

One generic strategy that companies can adopt to achieve competitive advantage in their industries entails becoming a cost leader – that is to produce goods or services at a lower cost than their competitors (Johnson and Scholes, 2002: 162). All major players, in any industry, pursue this strategy vigorously. An analysis of the value system is useful in identifying areas of cost advantage.

The value system (Figure 2) is the set of inter-organizational links and relationships, which are necessary to create a product or service (Johnson and Scholes, 2002: 162).

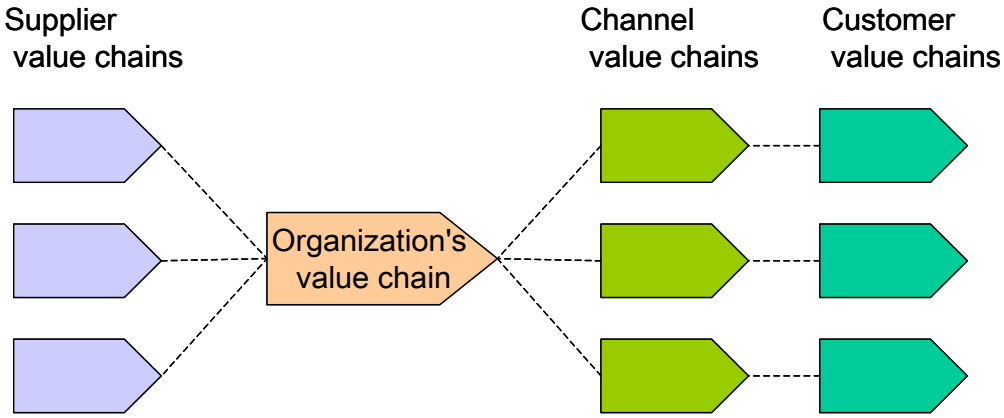

Figure 2. (Johnson and Scholes, 2002: 162)

The process of specialisation within the value system on a set of linked activities often underpins excellence in creating best-value products. Therefore an organization needs to be clear about what activities it will undertake. As organizations gain better knowledge of the wider value system and understand better where cost and value are created, they are able to make more informed choices on issues such as outsourcing, which may be the best partners and the kinds of strategic relationships to be forged with suppliers and partners (Johnson and Scholes, 2002: 162).

2.2. Value Chain

The value chain, in turn, describes the activities within and around an organization that together create a product or a service (Figure 3). Primary activities are directly concerned with the creation or delivery of the product or service, while support activities help to improve the effectiveness and efficiency of the primary activities.

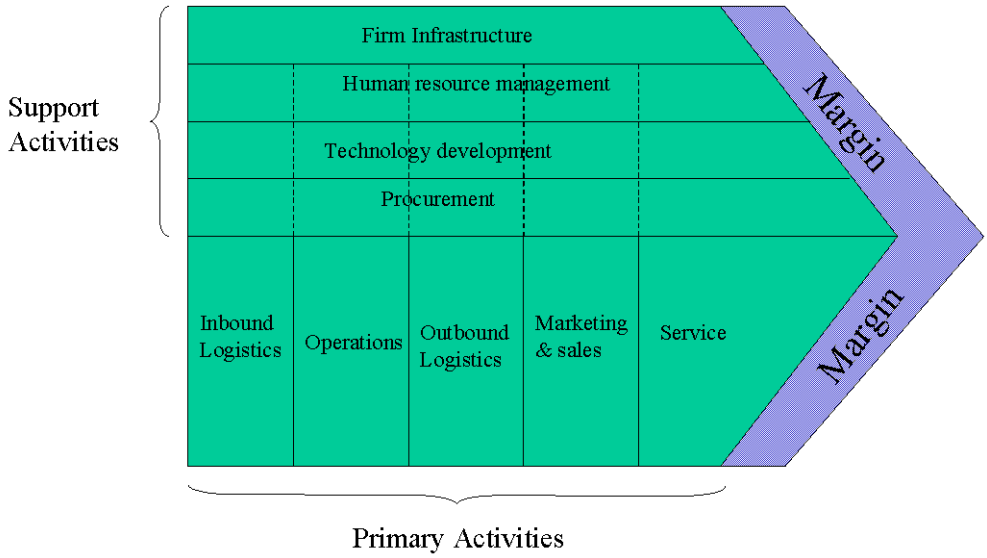

Figure 3. (Johnson and Scholes, 2002: 161)

In order to pursue a cost-leader strategy, the value chain provides an ideal model that can be employed to identify core competencies and focus on those functions in the organization where costs can be cut from the supply chain. Procurement, as a support activity coupled with inbound logistics, is an aspect of the value chain that should be targeted for improvement in delivering cost benefits and improving the effectiveness and efficiency of the primary activities (Johnson and Scholes, 2002: 332).

2.3. Supply Chain

Logistics and supply-chain management (SCM) is the synchronised movement of inputs and outputs of production and delivery of goods and services to the customer (Boyson et al., 1999:3). In this integrative

approach, a cross-functional group coordinates physical and informational resources to optimise efficiency and effectiveness.

SCM manages both the purchasing side and the distribution side of the resource stream as an integrated flow. This flow typically encompasses customer service, physical distribution, materials management and their related, highly complex sub-processes of order processing and tracking, production planning, supplier management, purchasing, warehousing and transportation, and electronic supply-chain communications and payment systems (Boyson et al,. 1999:3).

SCM spans functional barriers and interacts with many internal and external players. The Supply Chain organization generates energy and direction needed for an extended-enterprise network to operate efficiently and exchange inputs and outputs within its system wide borders (Boyson et al,. 1999:8).

A 1997 supply-chain benchmarking study conducted by the Performance Measurement Group, a subsidiary of Pittiglio Rabin Todd & McGrath, showed that best-in-class supply chain management in companies, enjoy an advantage in total supply chain management cost of 3-6% of revenue, hold 50-80% less inventory than their competitors and have a 40-65% advantage in cash to cash cycle time over average companies (Boyson et al., 1999:9).

2.4. Maintenance, Repair and Operation (MRO)

In order to ensure plant reliability and utilisation, manufacturing plants may hold stock of frequently used and strategically important MRO items in a site managed store, which is generally situated on-site. When these items are required, they are drawn from the store for use (Slack, Chambers and Johnston, 2004: 410). This practice allows for minimizing downtime

associated with breakdowns and ensures that the correct component is available as close to the job as possible whenever it is needed. This contingency MRO stock ensures that the inefficiencies of supply in respect of availability of supply, lead-times and cost are negated. In a perfect operation these components would be predictable and be delivered by vendors on a Just-In-Time (JIT) or Direct-to-Job basis (Slack, Chambers and Johnston, 2004: 474).

2.5. Procurement and Warehousing

JIT techniques can assist in reducing transportation batches and also channel inventory through the use of milk runs, consolidating several products from multiple sources for delivery to a single destination and cross docking (Ross, 1998: 219). However, the reality for many organizations is that JIT techniques are better suited to production line replenishment rather than the unpredictability of maintenance, repair and operations. Therefore, it is general practice that MRO supplies are held in stock to counter this unpredictability. This allows for direct to job replenishment from a local or site-located store.

The downside of holding MRO stock is the cost of capital associated with the stock-holding, obsolescence of stock due to shelf life expiration or technology advances The resources consumed in maintaining this stock The transactional cost of placing orders, price discounts, cost of stock-out and production inefficiency costs further add to the perceived disadvantages of holding MRO stock (Slack, Chambers and Johnston. 2001: 381). Inventory constitutes perhaps the single largest financial investment in the typical supply channel (Ross, 1998:217).

Stockholding is influenced by four main considerations, namely operational needs, lead time, availability of capital and the cost of storage (Jessop and Morrison, 1994: 139).

Mulcahy (1994: 14) contends that a number of activities performed by warehouse and distribution operations to achieve improved profit and customer service include, maximizing storage, equipment and labour utilization, minimizing operating costs. This ensures the protection of assets while reducing stock keeping unit (SKU) handling whilst maintaining accessibility and stock turn.

2.6. Conclusion

In conclusion, in order to achieve the strategic objective of cost competitiveness, the organization needs to develop an understanding of potential suppliers' or partners' capabilities and the core competencies and focus within the organization. Given this understanding and the acknowledgement of the competencies needed to add value to the supply chain for MRO supplies, the organization needs to explore the rationale to establishing channel relationships in respect of the procurement, warehousing and distribution of MRO supplies.

CHAPTER 3 – UNLOCKING MRO STRATEGIC ADVANTAGE

This chapter sets out to explore how the strategic advantage of MRO supply cost reduction can be achieved through the supply chain. In particular, it aims to identify criteria that support these initiatives and the benefits and concerns that organizations may have in implementing these initiatives.

3.1. Supply Chain Efficiencies

Supply chain efficiency can be improved through economies of scale, scope and coordination. One way to achieve supply chain economy of scale and scope is by consolidating material flows across multiple extended enterprise partners. For example, by consolidating loads from multiple suppliers or distribution centres located near each other, organizations can realize full truckload economies. Consolidated information which flows throughout the different stages of the supply chain and across multiple extended enterprise partners can create supply chain economies of coordination. A single entity can dynamically process customer orders and plan, track and bill freight shipments more effectively than could multiple entities with dissimilar skills and incompatible information systems (Boyson et al., 1999:157).

Economies of scope occur when an organization is able to lower its costs by producing more products together rather than just one alone. The learning curve shows the decline in the average input cost of production with rising cumulative total outputs over time (Salvatore, 2001: 301). Continuing high levels of outsourcing for warehouse operations reflect the increasing sophistication of warehousing procedures and automation systems. Warehousing may not be a core capability in many firms and outsourcing can help rationalize assets and achieve necessary economies

of scale while avoiding sunk costs during periods of extreme demand volatility (Boyson et al., 1999:120). At higher scales of operation, more specialized and productive machinery, technology and processes can be employed (Salvatore, 2001: 300).

In order to achieve economies of scale and scope as well as competitive advantage, companies are streamlining the number of suppliers from which they purchase. The reduced supplier base means that closer, longer-term relationships can be established with a few partners, who then play a critical role and contribute significantly to the company (Goffin, Szwejczewski and New, 1997:1).

The efficient use of warehouses can simplify routes and communication (Figure 4). In (a) below each factory supplies each customer and there are 18 separate lines of communication and physical distribution between each party. In (b) the routes have been reduced to 12. Each factory now only deals with two warehouse sites rather than six customers and each customer now deals with one warehouse rather than three suppliers (Slack, Chambers and Johnston. 2001: 424).

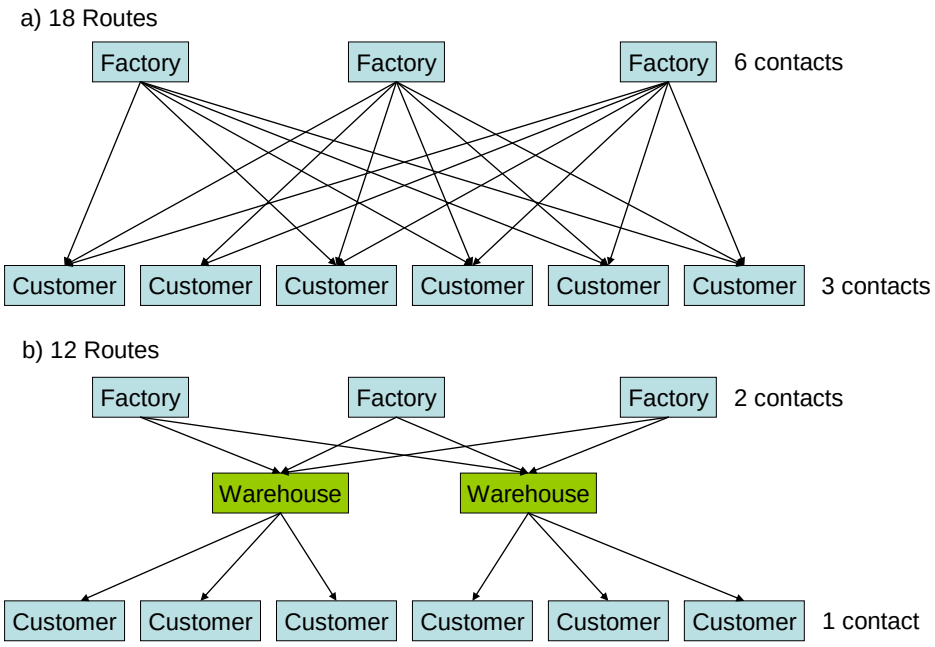

Figure 4. (Slack, Chambers and Johnston. 2001: 424)

The EOQ (Economic Order Quantity) formula attempts to find the best balance between the advantages and disadvantages of holding stock. EOQ is calculated by adding ordering to holding costs. Holding cost is generally made up of working capital, storage and obsolescence risk costs. Ordering costs are then made up of costs of placing the order, including transactional costs and transportation, along with price discount costs (Slack, Chambers and Johnston. 2001: 383). It can be seen in this calculation that a larger demand, greater price discount, lower transactional cost, lower transport cost, lower working capital demand and decreased risk of obsolescence will lead to lower total cost of holding inventory. This saving can be shared among players in the supply chain channel from vendors through to end-users.

Best practice companies centralize the management and control of those logistics activities that allow the organization to achieve operational efficiencies or other synergies (Boyson et al., 1999:38).

Van Weele (2005:23) supports this view in that organizations can realize important purchasing advantages through the combining of manufacturing plant requirements.

Centralized procurement not only allows firms to group purchases to obtain the largest quantity discounts, but may also lead to standardization of materials, thereby reducing stock keeping units and inventory carrying costs. This centralised procurement option is also better able to accommodate trans-shipments between stocking points, since various stock keeping locations are likely to be holding the same materials or products (Boyson et al., 1999: 39).

Many well-known retailers have embarked on initiatives to realise efficiencies and benefit through their supply chains, among these the GAP and Sainsbury's stores in the UK. The GAP has configured a network of distribution centres that consolidate and distribute products in transit from manufacturing centres to their stores (Boyson et al 1999:72). Sainsbury's have established fulfilment factories that each serves approximately 80 stores. They are highly automated and have approximately 1,000,000 square feet of production area. Their role is to receive product from suppliers and create the individual orders for each store. This requires significant investment by Sainsbury's in capital assets that require a high degree of automation and IT infrastructure (Banks, 2004: 32).

3.2. MRO in Supply Chain

MRO purchases tend to be routine, repetitive and low in value. Procurement professionalism in this type of purchase tends to be low. Some international and best-in-class companies have set up special programmes to cater for this type of procurement and have reported significant savings (Van Weele, 2005: 100). This practice elevates MRO

procurement from the routine to the strategic and potentially adds competitive advantage.

It is considered that the MRO service provider needs to be a generalist, dealing with a large degree of variation, combined with a high service orientation, advanced commercial skills and an efficient order handling system (Van Weele, 2005: 245).

The enterprise must pursue synergies in every aspect of its business in order to succeed in its ruthless and constant search for leverage in the marketplace. To date, most enterprises have only incorporated one or two outside trading partners or suppliers. However, competitive pressures will necessitate a much broader span of relationships, implemented at a much faster pace to the future (Boyson et al., 1999:195).

A third party MRO service provider may take many forms including a consortium, alliance, collaborative relationship or an organizational hub. The form will depend on the drivers of the initiative, the contractual obligations of the players, the means of conducting the relationship and the level of trust and cooperation among the end users.

During 2002 Huntsman Tioxide, a manufacturer of Titanium Dioxide pigments in the United Kingdom, consolidated the procurement, storage and provision of MRO supply requirements of four manufacturing plants in the Middlesburgh and Wilton areas. This contract was awarded to a single vendor who centralised the procurement and storage of all common MRO supplies. As supplies are needed they are supplied via regular milk-runs on a direct to job basis to all four manufacturing plants.

Due to the success of this initiative in the United Kingdom, Huntsman Tioxide in South Africa are keen to emulate the same concept but require a voluntary local collaboration among independent organizations.

3.3. Supply Chain Relationships

Successful supply channel inventory management mandates that customers and suppliers think of themselves as business partners. Because of this situation channel alliances are increasingly important. Partner relationships may exist among competitors and non-competitors and they exist for strategic or operational reasons (Ross, 1998: 239).

Collaborative channel relationships which are based on trust reduce transaction related cost and risk as well as enhancing sustainable competitive advantage under conditions of uncertainty and dynamic change (Hoyt and Hug, 2000: 5).

Although coordination and supply chain partnerships with vendors have economic benefits, some researchers have found that these relationships are costly to establish and maintain and may reduce a customer's ability to switch away from inefficient suppliers. Firms need to think strategically about supplier management and should perhaps not have a one-size-fits-all strategy. Firms need to consider whether the supplier's product contributes to core competence and competitive advantage. To achieve this, firms should foster strategic relationships with those vendors that provide inputs of high value and play an important role in differentiating the firm's final product. On the other hand, relationships with commodity based vendors, providing standardized inputs that do not contribute to the competitive advantage of the firm's final product, should be characterized by less communication, less assistance, fewer relation specific investments and frequent price benchmarking (Boyson et al., 1999:37).

Van Weele (2002 :245) contends that the following factors or criteria are commonly used when deciding whether to opt for centralization or decentralization within the organization or in collaboration with others;

- Commonality of purchasing requirements – more benefits can be derived from coordinated approach
- Geographic location – trading and management practices with cultural differences vary geographically
- Supply market structure – a better negotiating position can be achieved in the correct structure
- Savings potential – higher volumes translate to lower unit cost
- Expertise required – skills, focus and professionalism of the buyers
- Price fluctuations – price will be impacted by the political and economic climate
- Customer demands – may obstruct efforts aimed at purchasing coordination

Through a series of studies conducted from 1991, including surveys of 1200 companies, the Outsourcing Institute has developed a clear understanding of the reasons why companies outsource various activities and the potential benefits to be gained (Boyson et al., 1999:93). These include the following:

- Improved company focus
- Gaining access to world-class capabilities
- Accelerated reengineering benefits
- Sharing of risks
- Freeing of resources for other purposes
- Making capital funds available
- Creating a cash infusion
- Reducing and controlling operating costs
- Gaining access to resources not available internally

In contrast to the above, there are some concerns that companies need to address when considering outsourcing an activity and these may include:

- Declining innovation – losing touch with technical solutions
- Dependency on suppliers to perform
- Employees worried about own job – effect on motivation
- Exploitation of workforce – pay issues
- Risk of security of information
- Loss of skills and knowledge

Using the Van Weele and Boyson models it can be it is assumed that many of the given criteria, benefits and concerns have been addressed and realized by Huntsman Tioxide in the United Kingdom in their implementation of a third party MRO supplies vendor. However, the application of a similar concept for its plant at Umbogintwini in South Africa will have its own unique challenges.

3.4. A Local Supply Chain Solution

A concept has been proposed to address the local challenge (Figure 5). The concept suggests that vendors who previously supplied each end user independently will supply into one delivery and procurement point – the third party MRO vendor.

Independent manufacturing plant MRO requirements will be supplied by the third party MRO vendor. The independent manufacturing plants will constitute the third party MRO vendor’s customers and are the focus of this study.

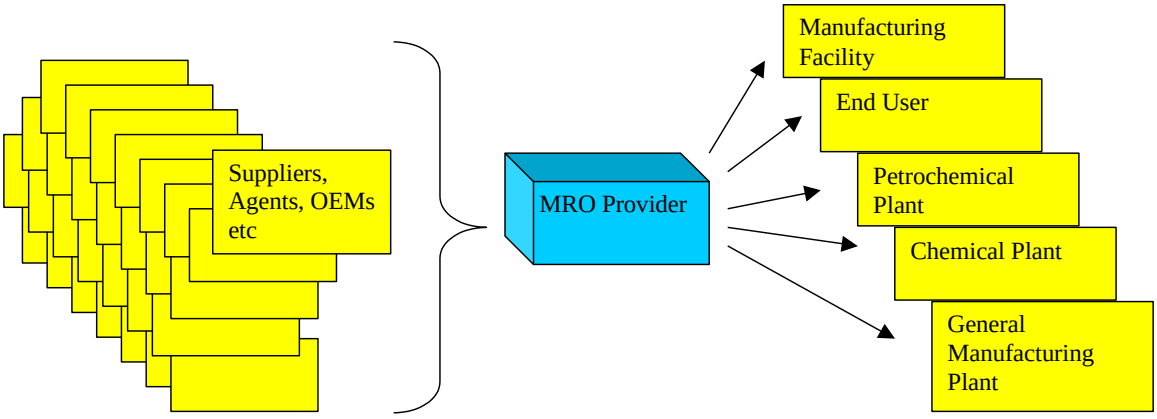

Figure 5. The Concept as adapted from: Huntsman Tioxide UK: 2000

It can be seen from the literature review that the implementation of the above concept should realize significant benefit to the participants. However, the proposed target manufacturing plants are all independent organizations. The ability of organisations to elevate MRO supplies to the strategic level, collaborate with other organizations and place trust in an unproven third party is unknown.

The primary objective of the research is to determine industry attitudes towards and perceptions of the concept of an independent third party MRO supplier. In particular the concept's perceived suitability for centralizing and collaborating on procurement and storage activities will be assessed using the van Weele (2002: 245) criteria. The research will also assess the industry attitudes to outsourcing these activities using Boyson et al's (1999: 93) Outsourcing Institute's reasons.

3.5. Conclusion

In this chapter various strategies for cost efficiency in supply chain were explored, along with the advantages and disadvantages in supply chain relationships that would be necessary for realizing these efficiencies.

A concept was introduced to realize supply chain efficiencies in the procurement and provision of MRO items to local industry.

Lastly the objective of this research and its means of measurement was introduced.

CHAPTER 4 – RESEARCH METHODOLOGY

4.1. Introduction

This chapter will introduce the research that was conducted. The chapter details the study type, sample, data collection, credibility, administration and limitations. Mention is made of areas where difficulties were experienced and where the research may have deviated slightly from proposal

4.2. Study Type

The study was conducted in the form of a case study with interviews conducted in the context of interviewee's organizations. The study is empirical in nature. In-depth personal interviews, conducted in the field have been used to collect primary textual data. The degree of control in the structure of the discussion guide was low. The time dimension is primarily cross sectional. An attempt was made to introduce a longitudinal aspect during the course of interviews. However, this proved to be impractical and it was concluded that this did not add value to the study (Mouton, 2005: 144 - 146).

Collected data is mainly exploratory and descriptive in nature. Quantitative and demographic data was also gathered to draw contextual conclusions.

4.3. Sample

The samples were drawn from manufacturing organizations in the Durban south geographical area. The basis for determining the sample was judgemental. This style ensured a cross-sectional representation of different industries, with different outsourcing experiences and conflicting buying decision-making objectives.

Units of analysis comprise independent manufacturing organizations. These were selected from an equal number of organizations that already subscribe to an existing 3rd party MRO procurement vendor and those that do not.

Units of observation were drawn from the organizational buying decision making unit. These comprise decision makers who have a procurement focus and those with the responsibility for engineering reliability.

4.4. Sample size

The sample size consisted of two decision makers drawn from each of four independent manufacturing organizations with plants in the Durban south area of Kwa-Zulu Natal.

Eight, 1 ½ to 2 hour interviews were conducted.

4.5. Data collection method

The concept was introduced in a five-minute vignette utilizing MS Power Point. Initial attitudes to and perceptions of the concept were then sought. Individual and organizational information was clarified in order to contextualize the concept relative to the organization. Final attitude and perception to the concept was then recorded.

An audio-recorded, in-depth personal interview with a loose discussion guide was used to gather data.

Interviews were transcribed to MS Word and Excel to facilitate analysis of the text.

4.6. Discussion Guide

The discussion guide (Appendix B) was split into 3 main components;

- Initial attitude to and perception of the concept
- Quantitative information to establish the organizational context relative to the concept
- Qualitative information to gauge attitude to and perception of the concept with better understanding of relative advantages and disadvantages to the unit of analysis.

Open-ended questions, with specific probing follow-up questions were asked to gain insight into areas.

The discussion guide was pilot-tested by engineering and procurement personnel at Huntsman Tioxide SA. No adjustments were made prior to further interviews, ensuring all opinions and perceptions gathered were consistent.

Copies of each interview transcript have not been attached due to their bulk, but are available from the researcher.

4.7. Credibility

Creditable quantitative research can be determined by examining the validity, reliability and generalise-ability of the gathered data. Making every effort to falsify any initial assumptions that are made about the data can make qualitative research credible (Silverman, 2001: 254).

The validity of respondent findings was confirmed by presenting these back to the interviewees for validation (Silverman, 2001: 306). Transcripts were sent back to interviewees.

The theory revealed barriers and perceptions to outsourcing and decision-making in the organizational buying unit, which will be used to confirm validity.

Reliability refers to the degree of consistency with which instances are assigned to the same category by different observers or the same observer on different occasions (Silverman, 2001: 225).

High reliability is associated with low-inference descriptors (Silverman, 2001: 254).

Where the similarity of data gathered within the same period is to be assessed, the standard means mechanism through which reliability is determined is the triangulation method. This forces the consideration of how multiple, yet somehow different, qualitative measures might simultaneously be true (Silverman, 2001: 226).

In this instance, true triangulation may not be possible. However, data will be analysed for reliability against data sought at the outset and conclusion of the interview. Data will also be cross-checked against data obtained from the other interviewees in the same organization and all data will be compared to the literature.

Combining qualitative research with purposive sampling can improve the ability to bring generalization to the research. Purposive sampling entails judgmental selection of the sample group where the processes or behaviour being studied is most likely to occur (Silverman, 2001: 250). Stratified judgemental sampling was used in the study.

In addition to the above, it is essential to avoid anecdotalism. Anecdotalism is marked by a tendency to select data to fit a preconception and the tendency to select field data which is conspicuous because it is exotic at the expense of the less dramatic, but possibly indicative data (Silverman, 2001: 222 - 223).

4.8. Administration

Interviews were transcribed to MS Word and Excel to facilitate analysis of the text.

The following data analysis approach by Rubin and Rubin (Mouton, 2005: 198) was applied. Data analysis began while the interview was still underway. This preliminary analysis helped to redesign questions to focus on central themes as the interview progressed. Once the interview was complete, a more detailed and fine-grained analysis was undertaken. Formal analysis revealed additional themes and concepts and contributed towards an overall explanation. The final analysis consisted of categorizing material from all interviews that speak to one theme or concept. Materials within the categories were compared for variations and nuances in their meanings. Comparisons were made across the categories to discover connections between the themes. The goal was the integration of themes and concepts into a theory that offers an accurate and detailed interpretation of the research area.

It was envisaged that the above process would be assisted by making use of computer-aided software (Atlas or Nudist) for the analysis of qualitative data. Due to the small sample size a manual method of theme identification was used.

4.9. Limitations

Due to the judgmental nature of the sampling and limited sample size, it is understood that a definite statement about the population may not be meaningful. However, this does not have a large impact on the objectives of the study (Mouton, 2005: 148).

It was further understood that the data collection and analysis may be time consuming (Mouton, 2005: 148). This proved to be true in arranging and conducting the interviews and in turn having these typed up.

Lastly, the research and interviews were conducted prior to 2005 and may now be dated. The concepts referred to in the literature remain valid and as the interviewer is in contact with the interviewees it is believed that the views expressed are still relevant.

4.10 Conclusion

This chapter detailed the research methodology employed in the study. The study type was empirical in nature, using audio recorded interviews to collect primary textual data. The sample was stratified judgmental drawn from four organization's buying decision making units. Microsoft Word and Excel were used in the analysis of the data. The small sample size is not seen as significant limitation.

CHAPTER 5 – INTERPRETATION OF RESULTS

5.1. Introduction

In Chapter Three it was stated that van Weele (2002: 245) and Boyson et al. (1999: 93) postulated several themes and factors that should be considered when pooling procurement initiatives and considering the outsourcing of functions. These themes and factors have been used as headings to the sections below to group data in determining the industry attitudes and perceptions to an independent central procurement and supply chain function for MRO supplies.

In particular the concept's perceived suitability for centralizing and collaborating on procurement and storage activities are assessed using the Van Weele's (2002: 245) criteria. The industry attitudes to outsourcing these activities are assessed using Boyson et al's (1999: 93) Outsourcing Institute's reasons.

5.2. COLLABORATION FACTORS

5.2.1. Commonality of purchasing requirements

Commonality supposes that there are benefits to employing a coordinated approach in the procurement of common items.

When reviewing the issue of commonality, many of those interviewed believed that there was scope in being able to identify the common low risk, low to intermediate value, high volume, and short lead time stock items. There remained concern for issues of customization and individual choice by different organizations e.g. branding on overalls and boot preferences.

Interviewees believed that certain current stock items are not common despite their perceived commonality for example bearings that have a wide range of uses and are suited to many different operating environments from extreme temperature to dusty and acidic conditions.

There are also items that will not be common e.g. digester refractory items that are unique, potentially high value, with long lead times and specific storage requirements. There would be no value in employing a third party to procure and store these. This will then mean a duplication of effort as the procurement and storage functions would still be required at each plant site.

There are some items of commonality that are critical components of high value and/ or long lead times that on the face of it should be held. However, in the event that there is a collective high demand for these items there is concern about how priorities will be determined and how risk may be mitigated.

It was suggested that participating organizations would need to have reached a level of maturity and discipline from a maintenance, procurement and predictability perspective in order to source from a 3rd party MRO vendor.

In conclusion, interviewees were divided in their opinion in terms of the extent of commonality of MRO stock items and were at pains to highlight those areas that were perceived as not common.

5.2.2. Geographic location

In the same geographic area cultural differences among organizations will be evident in differing trade and management practices.

Different industries in the same geographic area will operate in different physical environments with differing trading and management practices ranging from maintenance philosophy to units of measure and BBBEE philosophy. This will take huge effort and will to overcome.

Conversely, common culture and practice may be found among competitors and regionally based organizations at a macro environmental level.

Initially, with small numbers of participants, a new member of ‘the club’ will add a significant difference to its configuration.

One interviewee believed that the potential pool of participants in Durban would severely restrict the launch of the concept.

Primarily, interviewees were more concerned with differing physical environments rather than any cultural differences among organizations in a common geographical area.

5.2.3. Supply market structure

The structure of the supply market will influence an organization’s negotiating position.

Interviewees believed that equal or better price with superior service and security of supply would be an acceptable standard for a third party vendor to achieve. The vendor will need a strong cash flow and focus on

transactional and payment excellence to ensure a better negotiating position.

Some interviewees believed that certain current suppliers with significant power will not allow another entrant into the market and that unit price would escalate. Conversely, some experience shows that the smaller suppliers have less costs and therefore price more competitively, with better service and quality, to land a deal.

Some of the current buying departments believe that they have already secured the best deal and that there is nothing more to be had with greater volume. Benefits may only now be had when promotions are run or exchange rates allow a customer to stock up at a lower price.

A concern raised was that the vendor may squeeze margins to get into the market and then, with sufficient power when established, benefit excessively in the future.

In general, concern was expressed in respect of a third party's ability to enter the current market, the effect that it may have on the structure and its ability to entrench a strong negotiating position.

5.2.4. Savings potential

Higher volumes of items procured should translate into lower unit costs.

Some interviewees felt that the unit cost benefits should be shared pro rata in recognition of previous cost advantage from volume purchases, rather than equally

The benefit of the buyer acting strategically and professionally on even the small items will add value at all levels. This value should also be passed onto the supplier where waste is driven out of their interaction, larger volumes are supplied to a single site and payment is in line with terms. This should translate into lower unit costs.

Conversely, the commercial and technical link of being in direct contact with the supplier may result in benefits beyond the price e.g. market trends, new technologies and correct application. This may have greater benefits than the unit cost in some cases.

One interviewee expected that due to the steep learning curve at implementation an initial unit cost increase may be expected and that this may not be unreasonable given the potential for longer term savings with improved service levels.

Overall, interviewees expected that a lower unit price would be a primary objective for a third party vendor, but that this should not compromise existing service levels and access to supplier advice and information.

5.2.5. Expertise required

The procurement and store function's success is dependant on the skills, focus and professionalism of its staff.

Interviewees stated that the existing roles of buying, goods receipt at stores, stock counts and storeman service were a given and should be improved upon. There should be a focus on process integrity and segregation of duties to eliminate corruption. Buyers will need technical knowledge of each existing and evolving plant and a limited ability to provide advice to the operating sites. The buyer would need a significant

network of supplier contacts and the ability to perform minor procurement miracles of regular or unique components at short notice.

The buyers would need to act as ambassadors to maintain and ensure the connection between the supplier's technical expertise, new technologies and market trends, with the site needs.

The vendor would need to run a small item logistics or courier service. The store operation should run 24 hours per day, 365 days per year.

Performance guarantees in respect of quality, stockout or incorrect purchase and supply will need to be applicable though the whole supply chain so that responsibility is not abdicated.

The vendor would need comprehensive and robust information systems with the ability to establish and maintain simple and effective interfaces with various customized, off the shelf and home-grown ERP systems. Mr C Kock, Reliability Manager at Huntsman Tioxide SA, Durban (Interview 25 February 2005) took this further in stating, "… as your information system gets more robust, that physically it doesn't have to be at a central location. You are effectively managing the stock within the information system".

Invoicing for goods and services should consolidate paperwork for each order and delivery resulting in one invoice and payment.

Interviewees expected that all skills employed would have to add significant value, from professional procurement to information technology.

5.2.6. Price fluctuations

Macro economic factors, such as the political and economic climate will impact on price.

It was understood that prices may fluctuate when impacted upon by the political and economic climate. This would need to be managed through the average holding price of stock on hand.

5.2.7. Customer demands

Demands made by customers may obstruct efforts aimed at purchasing coordination.

Almost all of the interviewees had examples of complex or simple purchases they made that were unique to their operating site. These items could not be categorized by value, stock retention time, lead time or strategic significance to the maintenance operation. They ranged from embroidery and printing on PPE and digester refractory elements to environment specific bearings.

Several interviewees' highlighted items that were common fast moving consumable goods (FMCG) type items which could easily run through the proposed conceptual vendor. These ranged from laboratory supplies and fasteners to protective equipment and generic bearings.

In general, the attitude is encapsulated in the following quote by Mr R Archer, Purchasing Manager at Huntsman Tioxide SA, Durban, (Interview 28 February 2005), "if it saves money and makes life easier, and there's no compromise to the buying strategy and philosophy, it's a winner".

Mature and disciplined organizations will overcome objections and demands to achieve clear objectives.

5.3. OUTSOURCING FACTORS

5.3.1. Improve company focus

Outsourcing of an activity not deemed a core competency allows the organization to focus on areas that add value.

Existing maturity of information systems and maintenance philosophies of the participating organizations were seen as key requirements for participation in the concept.

It was agreed that the concept, as proposed, will create additional value in eliminating waste and improving efficiencies to an organization that has already achieved considerable focus on its core business and will drive improved focus on its own.

5.3.2. Gaining access to world class capabilities

Organizations may gain access to best in class systems and skills in outsourcing partners who manage a non-core activity with strategic intent.

As with the analysis done in respect of required expertise in the ‘collaborating factors’ section earlier, interviewees considered that the process of specification, order, storage and supply to application and payment for MRO items could be improved upon, along with the professionalism of the individuals employed within the process.

This would include the maintenance of access to original equipment manufacturers, agents and service providers' expertise and advice on world class practice to each organization.

The third party vendor should also add access to world class capabilities in their own right in respect of affiliated processes and systems such as information technology interfaces, storage, tracking, distribution and accounting.

Conversely, some interviewees believed that their current capabilities were already world class having secured the best deals and access to supplier expertise.

In conclusion, most interviewees were concerned that access to world class capabilities through their suppliers be maintained.

5.3.3. Accelerated reengineering benefits

Outsourcing of some activities will allow the organization to realign resources with strategic and core activities.

Reengineering benefits could accrue to an organization's in-house procurement, stores and creditors departments. Most interviewees felt that too much management time was taken up with small discrepancies that would be eliminated within the concept. However, some measure of capacity would need to be retained within each organization to manage the procurement of items not falling within the concept.

One interviewee felt that plant redundancy on critical systems is a key component of the maintenance philosophy. This would dovetail well with

the proposed concept as the immediacy of the repair would not be as critical.

Again, the issue of organizational maturity or discipline in maintenance and information systems, philosophy is considered to be vital in implementing this concept. The discipline imposed on industries operating in the petrochemical arena was mooted as an ideal example of an organization that would be able to accelerate reengineering to realize additional benefits.

Interviewees believed that in mature and well-disciplined organizations, it is expected that persons be tasked with identifying and pursuing opportunities for manufacturing improvement programmes. This would relate to the improvement and utilization of assets and processes in production and storage.

The ability to accelerate reengineering initiatives will be limited by the ability of organizations to standardize on common items and move as much volume as possible of these items through a third party MRO vendor

5.3.4. Sharing of risks

Risks currently borne by the organization can be shared or transferred to outsourcing partners and shared among a greater pool of their customers.

Risks relating to correct specification, price fluctuation, long lead time, stock redundancy, obsolescence, delivery on time, stock outs and resultant plant downtime were all felt to be common by interviewees. However, they felt that the situation would be no different whether self procured or procured through a third party. Again, the maturity and

discipline required within each organization will determine these relative risks.

There was concern expressed where demand for items is pooled. This would equate to less stock being required, but if high demand for all participating organizations coincides or overlaps then stock out and downtime may occur. In instances like this, the third party should offer some guarantee of supply to each organization and could incur extraordinary cost to cut the traditional lead time in procurement of this item. A further concern was that the original equipment manufacturer may not be as responsive given that their service level had not been compromised and that they now supplied at arm's length.

Ultimately, it was felt that all organizations would have a shared interest in ensuring the risk mitigation and sustainability of the third party vendor and would provide significant pressure and input to achieve this.

5.3.5. Freeing of resources

Resources currently employed in an activity can be released for deployment in other areas key to the organization.

Management and knowledge workers spend time managing and intervening in a process that is not seen as critical to the business. This time can be productively spent on core business requirements. Given the country's current skills and experience scarcity, the current resources employed in this process are largely sourced from within the organization's operations environment, These resources could be redeployed to this area or absorbed into the Third party vendor to provide them with difficult to gain plant knowledge.

Stores are often well located within each organization's operational site. Industrially zoned land is now scarce in major metropolitan areas and so the onsite storage space that can be redeployed to serve the primary activities of an organization is a benefit.

Many examples given by interviewees support the premise that resources could be better deployed within each organization.

5.3.6. Making capital funds available

Assets currently employed in the procurement and storage activity can be reduced or sold to make capital available for the organization.

Although all interviewees agreed that stock of MRO items held in on site stores was relatively high, this was often weighed against plant reliability and uptime. In this analysis the capital cost of the stock is small in comparison to the cost of plant downtime for example; a stock saving of R20m could translate into a production loss of R100m when a critical part is unavailable during at plant breakdown. Mr P Denyssen, General Manager of Brown and Root, Durban, (Interview 21 March 2005) expressed this concern as, "I want it when I need it without the cost and risk of stocks going sky-high".

The cost of carrying this stock will diminish but not disappear, as stock will still need to be held albeit centrally by a third party and in smaller volumes.

Further, the full value of this stock cannot be fully released as the proposed concept caters primarily for industry common items. Unique MRO stock items may still be carried by individual organizations.

Based on the above it is felt that the value released in reduced stock holding is not that significant.

5.3.7. Creating a cash infusion

Cash currently allocated to an activity through current terms could be released by consolidation or review with an outsourcing partner and redeployed in other areas of the organization.

One interviewee expressed some concern in respect of initial low market entry pricing that would change in time given market realities, establishment and power in the supply channel.

Others believed that they would not expect that unit prices would change and would not be prepared to pay more. While some engineers postulated that initial start up costs may be higher as the third party vendor climbs the learning curve, with a later return in efficiency and reliability as motivators. A couple of engineers seemed to be comfortable with incurring a higher cost to ensure plant reliability.

Interviewees generally agreed that unit costs should decrease in the long term overall and that service levels should increase significantly.

5.3.8. Reducing and controlling operation costs

The benefit of an outsourcing partner's focus on a non-core activity will contribute to better control and unit cost reduction in this activity.

Procurement transactional costs that would include staff, licenses and insurances per order vary from R79.00 upwards irrespective of the value of the order. These could be consolidated to single orders for multiple

items. Engineers would not incur the transactional cost, only the unit cost, and some went as far as to say they were unconcerned by these.

One interviewee was concerned that increased benefits of consolidated procurement in the form of discounts and rebates would be distributed equally amongst each organization that buys from the third party and may not be split on a weighed contribution basis for that item.

The costs of fraud and theft in the procurement chain would be minimized by focussed measures in a professional third party vendor.

Engineers would expect a quicker return and more efficient service from the Third party vendor leading to a better control of operating costs.

Waste will be reduced, as the economic order quantity per item can be smaller for individual users, while it is bigger for the Third party vendor e.g. the organization may require 100m of cable while the minimum order value is 1000m. This order quantity is spread and unit prices dropped.

Both procurement and engineers felt that the ability to deal with smaller breakaway entrepreneurial businesses remained important as their fixed cost base was lower and their at plant technical contribution often greater.

Overall interviewees agreed that operational costs could be better controlled and reduced through the use of a third party MRO vendor.

5.3.9. Gaining access to resources not available internally

Outsourcing partners will employ a different and higher skill set in executing an activity traditionally deemed non-core.

All interviewees repeatedly expressed the need to maintain the relationships with the current technical and commercial staff of their suppliers for specification, certification, warranty, plant, application, support, innovation and market knowledge.

The third party vendor, in turn, needs to have buyers with technical and plant knowledge. The buyers need to be well versed in commercial and contract aspects. The stores and local distribution operations need to be a step ahead of the best of the current suppliers in providing consistently high levels of service to each organizational site.

There needs to be improved back office administration in respect of invoicing, credit control, insurances, vendor management, stock taking, logistics and training as relate to the procurement and provision of MRO items.

The organizations who will be able to partake in this concept will have relatively mature and stable systems and good discipline in adhering to world class maintenance philosophies. This concept will provide a platform for learning and cooperation across different yet similar organizations.

Interviewees agreed that they would gain access to resources not available internally, yet continued to voice the concern that they may lose access to existing resources in current suppliers.

5.4. OUTSOURCING EXCUSES

5.4.1. Declining innovation

The organization may lose touch with commercial, market and technical solutions.

Interviewees were unanimous in expressing their need to maintain relationships with current technical and commercial staff of original equipment manufacturers, agents and service suppliers so that they are informed of specification, certification, warranty, plant, application, support, innovation and market knowledge.

This fear is summed up by Mr C Kock, Reliability Manager at Huntsman Tioxide SA, Durban (Interview 25 February 2005) “Yes, There is a risk of losing that”.

5.4.2. Dependency on suppliers to perform

The strength of an organization is in the strength of its supply chain partners. A failure in this chain means a failure for the organization.

This aspect is epitomized in the concern expressed by Mr T Petrusewitzc, Engineering Manager of Chemical Initiatives, Durban, (Interview 31 October 2005), “There is always a risk if you don’t handle things yourself. I’m not sure how reliable this organization is. There is the possibility of stock outs because they could do something wrong. It is out my control”. Some interviewees felt this was no more of a risk than the current set up within organizations.

Of greater concern among interviewees was the sustainability of the third party vendor. The implication of deteriorating to zero service would be significant. The ability of any organization to recover would be difficult and relate to staff, systems, process, stock and information.

Costs could also run out of control given that organizations would be tied into the concept with no viable competition.

Warranties and guarantees would also be dependant on the third party vendor's ability to abide by any conditions attached to these by suppliers.

Interviewees felt the need for a strong sustainable organization with checks and balances in place to balance relative power.

5.4.3. Employees worried about own job

Outsourcing will often result in a net loss of jobs this has a de-motivating effect on all employees.

All current operations have staff employed in the areas of procurement, storage and provision of MRO items. Many of these staff will have come from the operations department and will have technical along with plant knowledge and experience, a key requirement for the third party vendor. However, it is inevitable that there will be staff who will be surplus to requirement and who cannot be redeployed, so will face retrenchment.

Interviewees recognize that structural change is part of a cycle and is dealt with in the normal course of events.

5.4.4. Exploitation of workforce

The employment conditions of the outsourcing partners may not be aligned with the organization.

No interviewees raised this as a concern. This could be made a licence to trade without which no party will gain entry.

5.4.5. Risk of security of information

The sharing of key information will erode an organization's competitive advantage.

Now that information is shared, if one organization conceives or implements an innovation on its own or in conjunction with a supplier, there is the concern that they be compelled to share this with the Third party vendor community.

Plant modifications need to feed backwards into the third party vendor and need to be visible to other customers as they affect mutual stockholding and risk.

The pooled information on the price, value and consumption of stock items by customer and supplier would have significant value of its own and could be used to leverage suppliers and customers. The integrity and security of individual and collective information would need to be safeguarded.

5.4.6. Loss of skills and knowledge

Skills and organizational knowledge lost or transferred to an outsource partner will be difficult to retrieve.

Interviewees did not raise the loss of internal skills and knowledge as a concern, but repeatedly referred to the importance of maintaining existing relationships with key suppliers who over time will have built up significant skill and knowledge of organization's manufacturing sites and processes.

5.5. Conclusion

In this chapter the van Weele (2002: 245) and Boyson et al (1999: 93) themes and factors have been used as headings to group coded data from interviews in expressing the industry attitudes and perceptions to an independent central procurement and supply chain function for MRO supplies.

In particular the concept's perceived suitability for centralizing and collaborating on procurement and storage activities was assessed using the Van Weele (2002: 245) criteria. The industry attitudes to outsourcing these activities were assessed using Boyson et al's. (1999: 93) Outsourcing Institute's reasons.

CHAPTER 6 – CONCLUSIONS AND RECOMMENDATIONS

6.1. CONCLUSIONS

The objective of the research was to determine industry attitudes towards and perceptions of the concept of an independent third party MRO supplier.

Secondary objectives were to gain contextual data of the sample units of analysis and observation to support conclusions that may be drawn.

The area of study was the Durban South area of Kwazulu-Natal. The population constitutes more than twenty sites present in this geographical location. Sample units of analysis were selected on a judgemental basis to ensure that different industrial sectors with different outsourcing experiences were represented. Units of observation were drawn from opposing elements of the organizational buying decision making unit: procurement and plant engineering. The research time frame was single cross-sectional. Data of a qualitative descriptive nature was collected.

Data was obtained in a field study through eight in-depth personal interviews using a discussion guide.

Audio-recorded interviews were transcribed to Microsoft Word and Excel to facilitate analysis of the text.

Common themes in respect of attitudes and perception were then sought though the data and coded as such. Research findings were then compared to established literature.

In Chapter Three, van Weele (2002: 245) contends that the certain criteria are commonly used when deciding to opt for centralization within the organization or in collaboration with others. The Outsourcing Institute developed a clear understanding of the reasons why companies outsource various activities and the potential benefits to be gained, along with some reasons for not outsourcing (Boyson et al., 1999:93).

In the preceding Chapter, these criteria were used to group themes according to attitudes towards and perceptions of the proposed concept of a third party MRO vendor. On this basis it can be seen that findings were largely inline with the literature with some small deviations.

Commonality of purchasing requirements result in more benefits from a coordinated approach. Interviewees were divided in their opinion of the extent of commonality of MRO stock items and were at pains to highlight those areas that were perceived as not common. However, it is clear from the literature that economies of scale and therefore commonality of purchasing requirements are vital to the success of the proposed concept.

Van Weele (2002:23) goes on to say that organizations can realize important purchasing advantages by combining manufacturing plant requirements.

In order to achieve economies of scale and scope as well as competitive advantage, companies are streamlining the number of suppliers from which they purchase. The reduced supplier base means closer, longer-term relationships can be established with a few suppliers, who then play a critical role and contribute significantly to the company (Goffin et al., 1997:1).

Geographic location – trading and management practices with cultural differences. Interviewees were more concerned with differing physical environments rather than any cultural differences among organizations in a common geographical area.

Supply market structure – better negotiating position. Concern was expressed in respect of a third party's ability to enter the current market, the effect that it may have on the structure and its ability to entrench a strong negotiating position.

Although coordination and supply chain partnerships with vendors have economic benefits, some researchers have found that these relationships are costly to establish and maintain and may reduce a customer's ability to switch away from inefficient suppliers. Firms need to think strategically about supplier management and should perhaps not have a one-size-fits-all strategy. Firms need to consider whether the supplier's product contributes to their core competence and competitive advantage. Therefore firms should foster strategic relationships with those vendors that provide inputs of high value and play an important role in differentiating the firm's final product. On the other hand, relationships with commodity based vendors, providing standardized inputs that do not contribute to the competitive advantage of the firm's final product, should be characterized by less communication, less assistance, fewer relation specific investments and frequent price benchmarking (Boyson et al., 1999:37).

Savings potential – higher volumes translate to lower unit cost. Overall, interviewees expected that a lower unit price would be an important objective for a third party vendor, but that this should not

compromise existing service levels and access to supplier advice and information.

Economies of scope occur when an organization is able to lower its costs by producing more products together than one alone while the learning curve shows the decline in the average input cost of production with rising cumulative total outputs over time (Salvatore, 2001: 301).

Expertise required – skills, focus and professionalism of the buyers. Interviewees expected that skills employed by buyers would have to add significant value, from professional procurement to information technology.

MRO purchases tend to be routine, repetitive and low in value. Procurement professionalism in this type of purchase tends to be low. Some international and best in class companies have set up special programmes to cater for this type of procurement and have reported significant savings (Van Weele, 2002: 13). This practice elevates MRO procurement from the routine to the strategic and potentially adds competitive advantage.

Van Weele (2002: 251) goes on to say that the MRO service provider needs to be a generalist, dealing with a large degree of variation, have a high service orientation, advanced commercial skills and an efficient order handling system.

Continuing high levels of outsourcing for warehouse operations reflect the increasing sophistication of warehousing procedures and automation systems. Warehousing may not be a core capability in many firms and outsourcing can help rationalize assets and achieve

necessary economies of scale while avoiding sunk costs during periods of extreme demand volatility (Boyson et al., 1999: 120).

At higher scales of operation, more specialized and productive machinery, technology and processes can be employed (Salvatore, 2001: 300).

Price fluctuations – impacted by the political and economic climate*.* It was understood that prices may fluctuate when impacted upon by the political and economic climate. This would need to be managed through the average holding price of stock on hand.

Customer demands – may obstruct efforts aimed at purchasing coordination*.* In the interviews, many obstacles were identified that may obstruct the efforts aimed at coordination, but the overall attitude was encapsulated in the following quote by Mr R Archer, Purchasing Manager at Huntsman Tioxide, Durban, (Interview, 28 February 2005) “if it saves money and makes life easier, and there’s no compromise to the buying strategy and philosophy, it’s a winner”.

Mature and disciplined organizations will overcome objections and demands to achieve clear objectives.

Improve company focus**.** Interviewees agreed that the concept, as proposed, will add additional value by eliminating waste and improving efficiencies to an organization that has already achieved considerable focus on its core business and will drive improved focus on its own.

In a perfect operation these components would be predictable and delivered by vendors on a Just-In-Time or Direct-to-Job basis (Slack et al., 2001: 375).

However, the reality for many organizations is that JIT techniques are better suited to production line replenishment rather than the unpredictability of maintenance, repair and operations. Therefore, it is thought that MRO supplies are held in stock to counter this unpredictability.

This allows for direct to job replenishment from a locally or site located store. This supply needs to be immediate and round the clock to support MRO activities.

Gaining access to world-class capabilities*.* In contrast, most interviewees were concerned that access to world class capabilities through their suppliers would be hindered.

In order to achieve economies of scale and scope as well as competitive advantage, companies are streamlining the number of suppliers from which they purchase. The reduced supplier base means closer, longer-term relationships can be established with a few suppliers, who then play a critical role and contribute significantly to the company (Goffin et al., 1997:1).

Accelerated reengineering benefits**.** The ability to accelerate reengineering initiatives will be limited by the ability of organizations to standardize on common items and move as much volume as possible through a third party MRO vendor.

Sharing of risks. Ultimately it was felt that all organizations would have a shared interest in ensuring risk mitigation and sustainability of the third party vendor and would provide significant pressure and input to achieve this.

Freeing of resources for other purposes. Many examples given by interviewees support the premise that resources such as staff and cash could be better deployed within each organization if the MRO function was outsourced.

Making capital funds available. Interviewees felt that the value released in reduced stock holding would not be that significant. This appears to be in conflict to the literature.

The downside of holding MRO stock is the cost of capital associated with the stock-holding, obsolescence of stock due to shelf life or technology advances, the resources consumed in maintaining this stock, transactional cost of placing orders, price discounts, cost of stock-out and production inefficiency costs (Slack et al., 2001: 381).

Inventory constitutes perhaps the single largest financial investment to be found in the typical supply channel (Ross, 1999: 217).

To be fair, the total inventory will not disappear but will be reduced across the supply chain with the introduction of the third party MRO vendor concept.

Creating a cash infusion. Interviewees generally agreed that unit costs should decrease overall with an associated improvement in operational costs and that service levels should increase significantly.

Centralized procurement not only allows firms to group purchases to obtain the largest quantity discounts, but may also lead to standardization of materials thereby reducing stock keeping units and inventory carrying costs (Boyson et al., 1999: 39).

Reducing and controlling operating costs. Overall, interviewees agreed that operational costs could be better controlled and dropped though the use of a third party MRO vendor. This is certainly supported in literature

Organizations can enjoy an advantage in total supply chain management cost of 3-6 % of revenue, hold 50-80 % less inventory than their competitors and have a 40-65 % advantage in cash to cash cycle time over average companies (Boyson et al., 1999:9).

Best practice companies centralize the management and control of those logistics activities that allow the organization to achieve operational efficiencies or other synergies through a centralized approach (Boyson et al., 1999:38).

Gaining access to resources not available internally.
Interviewees agreed that they would gain access to resources such as information technology, systems and staff not available internally, yet continued to voice concerns that they may lose access to existing resources with current suppliers.

Declining innovation – losing touch with technical solutions.
Interviewees were unanimous in their need to maintain relationships with current technical and commercial staff of original equipment

manufacturers, agents and service suppliers for specification, certification, warranty, plant, application, support, innovation and market knowledge.

Dependency on suppliers to perform. Interviewees felt the need for a strong sustainable organization with checks and balances in place to balance relative market power.

Employees worried about own job – effect on motivation. Interviewees recognized that structural change is part of a cycle and is dealt with in the normal course of events though project and change management mechanisms.

Exploitation of workforce – pay issues. No interviewees raised this as a concern; this would be a licence to trade without which no party will gain entry.

Risk of security of information. The pooled information on the price, value and consumption of stock items by customer and supplier would have significant value of its own and could be used to leverage suppliers and customers. The integrity and security of individual and collective information would need to be safeguarded. This is well supported by the literature.

These collaborative channel relationships based on trust reduce transaction-related costs and risks as well as enhancing sustainable competitive advantage under conditions of uncertainty and dynamic change (Hoyt and Huq, 2000:5).

Loss of skills and knowledge. Interviewees did not raise the loss of internal skills and knowledge as a concern, but repeatedly referred to

> the importance of maintaining existing relationships with key suppliers who will over time have built up significant skill and knowledge of the organization's manufacturing sites and processes.
>
> The enterprise must pursue synergies in every aspect of its business in order to succeed in its ruthless and constant search for leverage in the marketplace. To date most enterprises have only encorporated one or two outside trading partners or suppliers. However, competitive pressures will necessitate a much broader span of relationships, implemented at a much faster pace. (Boyson et al., 1999:195)
>
> Successful supply channel inventory management mandates that customers and suppliers think of themselves as business partners. Channel alliances are increasingly important. Partner relationships may exist among competitors and non-competitors and may exist for strategic or operational reasons (Ross, 1999: 239).

From the above a summary of attitudes and perceptions unfavourable to the concept are;

- Loss of input from key suppliers with plant, product, market and commercial knowledge will hinder process innovation.
- Lack of competition will lead to unit price increase and lower service levels in the long run.
- Immaturity and ill discipline in respect of information integrity and application of world class maintenance philosophies will hinder South African industry in realizing benefits.
- Similarities among industries are not as great as envisaged in respect of goods, physical environments and processes.
- Fear of a loss of control and the perception that the current process cannot be improved upon.

- A perception that manufacturing activities in Durban are not significant or large enough to support the concept.

In contrast to the unfavourable attitudes and perceptions, the following are favourable;

- The procurement and provision of many MRO items is not a core activity that adds strategic value and could be better managed by a third party.
- The current costs and processes can be improved upon. There is a lot of waste. Inefficient processes and excessive costs are tolerated in favour of plant uptime and reliability.
- In order to compete better, there is recognition that supply chains, rather than organizations, need to be efficient and effective.
- Information is often more effective when shared in collaboration.

Perceptions and attitudes differed more between organizations than between the functions of procurement and engineering, supporting the notion that maturity in systems and philosophies is very important in the ability of an organization to implement strategic change.

The models of Van Weele (2002: 245) and Boyson et al (1999: 93) in respect of centralization and outsourcing of the procurement function provided a robust and constructive framework to measure the attitudes and perceptions of a cross-section of maintenance engineering, and procurement practitioners in respect of a proposed third party MRO concept.

Alignment between the literature and research findings has been summarized in Table 1.

Model	**Alignment**
Centralisation and Collaboration (Van Weele, 2002: 45)	
Commonality of Purchasing Requirements	√
Geographic location	X
Supply market structure	√
Savings potential	√
Expertise required	√
Price fluctuations	√
Customer demands	√
Benefits (Boyson et al., 1999: 93)	
Improve company focus	√
Gaining access to world-class capabilities	X
Accelerated reengineering benefits	X
Sharing of risks	√
Freeing of resources for other purposes	√
Making capital funds available	X
Creating a cash infusion	√
Reducing and controlling operating costs	√
Gaining access to resources not available internally	√
Concerns (Boyson et al., 1999: 93)	
Declining innovation – losing touch with technical solutions	√
Dependency on suppliers to perform	√
Employees worried about own job – effect on motivation	X
Exploitation of workforce – pay issues	X
Risk of security of information	√
Loss of skills and knowledge	√

Table 1. Summary of Alignment between Literature and Research

6.2. CRITICISM OF THE STUDY

In the course of conducting and interpreting the research the author took note of the following;

- Interview times decreased as the interviewer gained more experience and focus was placed on key areas. While the intent of the interviews was to be unstructured and allow explorations into areas not envisioned, a rough guide was used to ensure that the main topics were covered. Longer interviews often missed the point and hindered or clouded the interpretation.
- In the later interviews the interviewer tended to lead the interviewee and the use of open ended questions became difficult. This follows on the above point and defeats the research objectives, allowing the interviewer's bias to taint the research.
- The recording equipment was not always properly used. This led to some transcripts not being absolutely complete in areas where acoustics were not of the best quality.
- In the course of transcription two typists were used. This may have led to some inconsistencies in the scripts and resulted in some difficulties with managing the data.
- As in the above point a number of typos were identified in reviewing the audio tapes of interviews with the scripts. This review was a necessary but laborious process.
- The interview guide should have been more rigorous and adhered to and should have restricted itself to the Van Weele and Boyson models. This would have helped in analysis.

In hindsight, the preparation for the interviews, the interviews themselves and the transcript process would be the key learning of the research study.

6.3. RECOMMENDATIONS

Drawing from the conclusions of the study the following key recommendations can be distilled;

- Manufacturing sites need to have well-established, mature and disciplined approaches to maintenance philosophies and information systems in order to partake in the concept. They will add value to other participants and in turn derive value in the form of lower unit and transactional costs along with an improved service delivery by pooling their MRO requirements and sharing risk.

- Logistics distances and the incidence of sufficient mature and disciplined manufacturing sites will determine the geographic suitability of the concept. Sites within the same geographic area will have significant operating differences, but many of the same macro environmental constraints.

- The geographical competition with other national manufacturing nodes for scarce resources needs be explored as an opportunity for local collaboration.

- The need to maintain the relationship between key suppliers in providing technical, market and commercial input to the organization's manufacturing site is of key importance. No other party could fulfill this role. The third party MRO vendor would need to devise a mechanism for ensuring that these relationships are maintained and strengthened.

- The current market structure would be disrupted by the introduction of a third party MRO vendor. The establishment of this new structure will test and damage some existing relationships and may

come at a cost. Once established, care needs to be taken in respect of the relative power and sustainability of this new entrant which may impact unit prices, information flows, competition and choice of solutions. Transparent supply and service level agreements will need to be in place. The core focus, professionalism of staff and information of the third party vendor would need to be leveraged for the greater good of all participating organizations.

- The commonality of MRO items would need to be determined and standardized. Consideration would need to be given to procurement and provision of unique and customized items to avoid a duplication of these efforts between organizations and the third party MRO vendor.

Given that the concept is seen as viable, further research is vital in determining whether this is an appropriate concept to practically introduce into a geographically unique manufacturing environment.

6.4. FURTHER RESEARCH

Further research will be vital if the concept is to be introduced as the barriers to entry and exit will be high. The following areas are seen as vital:

- Review the competing geographic manufacturing nodes in South Africa in respect of the incidence of suppliers and users within logistically effective areas.

- Measure and determine the relative maturity and discipline in respect of information systems and maintenance philosophy of manufacturing organizations in the same geographic area.

- Measure and determine the operational and macro similarities and differing environments and challenges of manufacturing organizations in the same geographic area

- Measure and determine the value and commonality of MRO stock items in unique geographic area

- Measure and determine the value and commonality of unique and capital stock items in unique geographic area

In this chapter, conclusions have been drawn between the results as determined in the interpretation and established literature on the subject. A criticism of the research was made and recommendations were made for organizations that may consider the proposed concept along with areas for further research.

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APPENDICES

A. List of Interviewees

Interviewee	Organization	Position	Qualification	Experience	Interview Date
Chris Kock	Huntsman Tioxide	Reliability Engineer	Graduate Engineer and MBA	> 10	25. 02. 2005
Robin Archer	Huntsman Tioxide	Purchasing Manager	Graduate Engineer	< 20	28. 02. 2005
Paddy Denyssen	Brown & Root	General Manager	Higher Diploma Mech Engineer	> 20	21. 03. 2005
David Morgan	Brown & Root	Financial and Administration Manager	Commercial Graduate with Social Science	> 10	28. 03. 2005
Ben Laing	Natal Portland Cement	Plant Engineer	Graduate Engineer and Masters	> 10	01. 06. 2005
Schalk Coetzee	Natal Portland Cement	Purchasing Manager	Diploma	> 10	16. 06. 2005
Tom Petrusewitcz	Chemical	Engineering	Post	> 15	31. 10. 2005

	Initiatives	Manager	Graduate Engineer		
Robbie Tomsett	Chemical Initiatives	Technical Buyer	Diploma Purchasing	> 10	31. 10. 2005

B. Interview Guide

Introduction

Thank you for taking the time to allow me to gather your attitude & perception to a MRO concept. It is expected that this can be completed in **1 hour**. This will be done while interviewing.

The information and opinion given and expressed during this interview is recognized as **confidential**, the opinion of the interviewee and not the official position of the organization. If uncomfortable with any question then please do not answer.

The interviewer has taken the time to **explain the concept**. (Concept literature with explanation is provided in Power Point 5 min presentation). This guide seeks to establish the organization in the context of this concept and to elicit attitudes and perceptions in respect of the concept.

Explain the benefit of completing / participation to the interviewee.

Questions the following categories **Personal Detail, Organization, Initial A&P, Site Operation, Systems, Processes, MRO activity, Final Attitude and Perception and Additional Organizational Information**

Personal
What is the respondent's name?
_____

Respondant's current position

_____

Qualifications

School leavers certificate	Matric	Graduate Engineer	Commercial Graduate	Post graduate
Masters	Doctorate	National Diploma	National Certificate	Other

Length of service in the organization

Less than one year	Less than three years	Less than five years	Less than ten years	More than ten years

Service in present position

Less than one year	Less than three years	Less than five years	Less than ten years	More than ten years

Organization

What is the registered trading name of the manufacturing site?

_____

Is the site part of a larger group or organization?

Yes	No

Where is the head office situated?

_____

What is the primary product that is manufactured?

_____

What secondary products are manufactured?

_____

What is the annual turnover of the organization?

< R1 Million	> R1 but < R10 Million	>R10 but < R50 Million	>R50 but < R100 Million	> R100 Million

What is the site's contribution to turnover?

< R1 Million	> R1 but < R10 Million	>R10 but < R50 Million	>R50 but < R100 Million	> R100 Million

How many people are employed by the organization

Less than 50	Less than 100	Less than 250	Less than 500	More than 500

How many people does the site employ?

Less than 50	Less than 100	Less than 250	Less than 500	More than 500

Concept – 3rd party MRO service provider – attitude & perception (Initial)

What is your overall impression of the concept?
Risk (stock-out, downtime….)

Technical support (products, vendors, innovation..)

Plant reliability (uptime, quality….)

Stock capital (Holding, JIT, DTJ…)

Vendors (cooperation/ motivation, supply chain, interaction, support….)

ERP systems (integration, costing…..)

Processes (Maintenance, projects, procurement, finance..)

Spend and cost (Unit costs, site resources, leverage…)

Transactional cost (Process, resources..)

Added Value (Competitive advantage, cost, reliability, quality..)

Site *Operation*
What are the hours of operation?

8/5/52	24/5/52	24/7/365	24/7/365 with shuts	Seasonal	Other_____ _____

How is maintenance time allocated?

Reactive	Scheduled	Predictive	Condition monitoring	Shutdown

What are the typical site hazards?

Heights	Chemical	Fire	Gas	Electrical
Lifting	Light	Noise	**Other**_____ _____	**Other**_____ _____

What is the monetary impact of a plant shutdown?

Less than R100K	More than R100K	More than R250K	More than R500K	More than R1 Million

What are the other impacts of a shutdown

Overtime	Lost orders	Plant stability	Other_____ _____	Other_____ _____

Systems

What Enterprise Resource Planning system does the site use?

SAP	Baan	JDE	Marcam	Other_____ _____

Does the ERP system incorporate Plant Maintenance, Procurement and Materials Management?

All	Plant Maintenance	Procurement	Material Management	None

Where is the ERP system based? (Physical, configuration & change resources)

Site based	Part of a larger organizational system	Other_____ _____

Processes

Are MRO items procured using the ERP system?

Yes	No

Is Material Requirements Planning (MRP) logic used to determine requirements?

Yes	Predominantly	Partially	No

Are manual processes involved in determining demand?

Yes	Predominantly	Partially	No

At what level are approvals set for MRO procurement?

Site Operator	Artisan	Foreman	Manager	Senior Manager

Are items issued from store with approval?

Yes	No

Are MRO items bought on contract?

Yes	No

Are MRO contracts tendered?

Yes	No	Sometimes

Is spend leveraged with other sites?

Yes	No	Sometimes

Maintenance, Repair and Operational supplies (MRO) activity

Please indicate, by means of a cross in the attached MRO listing, the generic MRO items that are procured and used by the site.

Bearings	Gaskets	Lubricants	Electrical components	Steel & steel fittings
Personal Protective Equipment	Fuels	Laboratory consumerables	Office consumerables	Fasteners
Valves & spares	Pumps & spares	Electric Motors & spares	V Belts	Ropes & Chains
Cladding	Tools	Batteries	Instrumentation components	Seals
Conveyer equipment & spares				

Are the majority of MRO items regarded as site specific or generic, almost commodity-type items?

Site specific	Few generic items	Small list of specific items	Many made for site items	Commodity type items

Are MRO items procured by the site?

Yes	No	Partially

What resources are employed in the procurement of MRO items?

Engineering	Purchasing	Accounts	Stores	Projects

Who is responsible for procurement?

Engineering	Purchasing	Accounts	Stores	Projects

Who specifies the items to be procured?

Engineering	Purchasing	Accounts	Stores	Projects

Is the procurement of MRO items considered a core site competency?

Yes	No	Occasionally

Is a significant amount of time focused on this activity?

Yes	Relative to spend	No

What is the capital value of MRO stock held by the organization?

No stock	Less than R1 Million	Less than R5 Million	Less than R10 Million	More than R10 Million

Where are MRO items stored?

Engineering store on site	Engineering store off site	3rd party managed store	Central store	Vendor managed store

What is the annual incidence of MRO stock-out?

Less than 10 items	Less than 20 items	Less than 50 items	Less than 100 items	More than 100 items

Can the incidence of MRO stock-out lead to a plant shutdown?

Yes	No	In selected cases

'In selected cases' above which items may lead to plant down time in the event of a stock-out? Some examples

_____
_____
_____

Concept – 3rd party MRO service provider – attitude & perception
(In light of the questionnaire and last two MS PowerPoint slides)

What is your overall impression of the concept?
Risk (stock-out, downtime….)

Technical support (products, vendors, innovation...)

Plant reliability (uptime, quality...)

Stock capital (Holding, JIT, DTJ…)

Vendors (cooperation/ motivation, supply chain, interaction, support….)

ERP systems (integration, costing…)

Processes (Maintenance, projects, procurement, finance..)

Spend and cost (Unit costs, site resources, leverage…)

Transactional cost (Process, resources...)

Added Value (Competitive advantage, cost, reliability, quality...)

Further information
Which individuals by position, or teams or committees constitute the decision-making unit that would be instrumental in approving and implementing a strategic concept as proposed?

_____
_____
_____

Is the organization / site used to or resistant to change initiatives

Contant change	Occational change	Little or no change

Is the organization in a healthy financial state?

Always profitable	Margins are under pressure	Running at a loss

Again – what is your overall perception of the concept, will this add value to your organization, what obstacles do you see in implementing a solution like this and what other issues have not been addressed or foreseen?

Thank you for taking part in this survey.

Again your replies will be treated confidentially and a copy of the final report will be submitted to you when complete.