

# **STRATEGIC MARKETING OPTIONS**

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BY

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## **Declaration of own work**

I declare that the work in this research report was carried out in accordance with the guide line of the University of South Africa. The work is original except where indicated by special reference in the text and no part of the research report has been submitted for any other degree. Any views expressed in the research report are those of the author and in no way represent those of the University of South Africa.

SIGNED: R. du Toit (electronically)

DATE: 02 May 2010

## **Executive Summary**

Over the last four years Palabora vermiculite ore body has shown a decline in coarser grades fractions (large and medium). Process improvements were implemented to increase recovery rates in all grades. The increase coarser grades recoveries currently have no significant impact on the production output for these grades. The increase in recovery rates of finer grades resulted in a surplus production of superfine and micron and is currently stockpiled on site. With the decline in coarser grades, PV is unable to satisfy market demand for coarser grades. In order for PV to stay ahead of competition and to further enhance the company's position as the market leader in today's changing environment, this research will indeed outline the key issues PV should consider for future business.

In this research, relevant data from within the PV markets were gathered which included qualitative and quantitative data. Qualitative research was selected due to its ability to allow respondents to speak freely about the chosen subject and its ability to obtain the widest possible responses.

The aim of this research was to determine if strategic marketing options will grow the sales of finer grade vermiculite. The objectives that were looked at were:

- To determine why the customers prefer coarser grades.
- To investigate potential alternative uses for finer grades.
- To determine how the finer grades can be marketed to current users of coarser grades.

Definite boundaries exist within the research study due to geographical displacement in the majority of vermiculite consumers across the world. The problematic issue of supplier and customer loyalty in an intense competitive industry has proved to have inherited barriers to competitor specific information, thus the reliance on secondary data with regards to competitor's mining capability, crude production and competitive advantages.

From analysis of data collected, the following observations were made:

- There is a consistent perception that the specific grade been used is critical to an application.
- Only 27% of PV's customer base is currently doing R&D. This is mainly in refractory and construction industries.
- Customer indicated that they are not flexible on product qualities i.e. screen sizing and yield. This indicates that to market finer grades in coarser grade markets will require R&D and marketing on the part of PV.

For PV to increase its finer grades sales they need to adopt a new or change their existing marketing strategy. PV management needs to consider the following:

- Different price strategies can be adopted for different situations i.e.:
  - Penetration pricing - The price charged for products is set artificially low in order to gain market share. Once this is achieved, the price is increased. (local and Asia markets)
  - Value pricing - This approach is used where external factors such as recession or increased competition force companies to provide 'value' products to retain sales. (Europe and American markets)
- To develop alternative uses for finer grades vermiculite PV needs to engage in R&D. Management needs to be well informed about the marketplace and in particular customers who are more likely to envision realistic and meaningful new product ideas. Consistent market understanding best comes from formal processes designed to generate market intelligence and not from merely ad-hoc interactions with the marketplace (Flint, 2002: 306).

## **TABLE OF CONTENTS**

CHAPTER 1.....	9
1. Problem in context, Problem statement and Objectives .....	9
1.1 Introduction.....	9
1.2 Background and problem in context .....	10
1.3 Problem review.....	12
1.4 Problem statement/ Research question.....	16
1.5 Importance of the research to Palabora Vermiculite.....	17
1.6 Research limitations .....	17
1.7 Summary .....	17
CHAPTER 2.....	18
2. Problem analysis / theoretical consideration.....	18
2.1 Introduction.....	18
2.2 Determine why customers prefer coarser grades .....	20
2.3 Investigate potential alternative uses for finer grades.....	21
2.4 How the finer grades can be marketed to current users of coarser grades. ....	22
2.5 Summary .....	25
CHAPTER 3.....	26
3. Literature Review.....	26
3.1 Introduction.....	26
3.2 Customer preference.....	26
3.3 Product development / innovation and alternative uses .....	28
3.4 Marketing strategies .....	30
3.5 Summary .....	34
CHAPTER 4.....	35
4. Research Design and Methodology.....	35
4.1 Introduction.....	35
4.2 Aims of Research .....	36
4.3 Research design.....	36
4.4 Data gathering procedures .....	36
4.5 Characteristics of the sample .....	39
4.6 Data analysis approach.....	40
4.7 Limitations of the research project.....	41
4.8 Summary .....	41

CHAPTER 5.....	42
5. Results.....	42
5.1 Introduction.....	42
5.2 Primary results.....	43
5.3 Secondary results.....	51
5.4 Summary .....	60
CHAPTER 6.....	61
6. Discussion of Results .....	61
6.1 Why customers prefer coarser grades.....	61
6.2 Potential alternative uses for finer grades .....	61
6.3 How the finer grades can be marketed to current coarser grade users .....	62
CHAPTER 7.....	63
7. Conclusions and Recommendations .....	63
8. References .....	66
9. Appendices.....	70
9.1 Appendix 1: Palabora Vermiculite open pit mining area .....	70
9.2 Appendix 2: Theoretical underpinnings of new product adoption in uncertain environments.....	71
9.3 Appendix 3: South Africa customer’s questionnaire. ....	72
9.4 Appendix 4: International customer’s questionnaire. ....	74
9.5 Appendix 5: South Africa customer’s questionnaire feedback.....	77
9.6 Appendix 6: International customer’s questionnaire feedback.....	79

## LIST OF TABLES

Table 1.1: Ideas and issues raised from the brainstorming sessions.....	11
Table 2.1: Ansoff's matrix.....	22
Table 3.1: Specific key questions to be answered during the gap analysis.....	31
Table 4.1: List of subsidiaries.....	37
Table 4.2: Sample characteristic of the Vermiculite Industry.....	40
Table 5.1: Global vermiculite producers.....	56

## LIST OF FIGURES

Figure 1.1: Brainstorming outcome.....	11
Figure 1.2: Brain map.....	12
Figure 1.3: Winnowing process.....	13
Figure 1.4: Vermiculite percentage sales per Region – 2009.....	15
Figure 2.1: Coarser grades production (Large and Medium) from 1996 to 2009.....	18
Figure 2.2: Finer grades production (Fine, Superfine and Micron) from 1996 to 2009...	19
Figure 2.3: Customer demand versus actual production from 2007 to 2010 plan.....	19
Figure 2.4: Porter's Five Forces.....	23
Figure 2.5: Boston Consulting Group's (BCG) Growth Share Matrix.....	24
Figure 5.1: Percentage end application types use in South Africa.....	44
Figure 5.2: Percentage end application types use in America.....	46
Figure 5.3: Percentage end application types use in Europe.....	46
Figure 5.4: Percentage end application types use in Asia.....	47
Figure 5.5: Tonnes sold per geographical area 2004 – 2009.....	51
Figure 5.6: Tonnes sold in Europe from 2004 – 2009.....	52
Figure 5.7: Price increase per grade for Europe from 2004 – 2009.....	52
Figure 5.8: Tonnes sold in America from 2004 – 2009.....	53
Figure 5.9: Tonnes sold in Asia from 2004 – 2009.....	54
Figure 5.10: Price increase per grade for Asia from 2004 – 2009.....	54
Figure 5.11: Tonnes sold in South Africa from 2004 – 2009.....	55
Figure 5.12: Price increase per grade for South Africa from 2004 – 2009.....	55
Figure 5.13: Global vermiculite production for 2004.....	57
Figure 5.14: Global vermiculite production for 2009.....	57
Figure 5.15: Annual production by SA, USA, China and Zimbabwe 2004 to 2009.....	55

## **LIST OF ABBREVIATIONS**

BCG - Boston Consulting Group's

EDA - Explanatory Data Analysis

PAL - Palabora Asia Limited

PEL - Palabora Europe Limited

PMC - Palabora Mining Company

PP&V - Phlogopite, Phosphate and Vermiculite

PV - Palabora Vermiculite

PESTLE - Political, Economic, Social, Technological, Legal, Environmental

R&D - Research and Development

SCL - Sectoral competition level

SWOT - Strength, weakness, opportunities and threats analysis

VOD - Vermiculite Operation Department

UAE - United Arab Emirates

UK - United Kingdom

USA - United States of America



# **CHAPTER 1**

## **1. Problem in context, Problem statement and Objectives**

### **1.1 Introduction**

The mineral name Vermiculite might not be a familiar term to many people in South Africa unless you are a geologist or employed by a mining company that mines minerals from the mica family. This unfamiliar mineral is mined in South Africa which also hosts the single largest vermiculite mine in the world, Palabora Mining Company (The Economics of Vermiculite, 2004). Furthermore, the vermiculite department has been summarised within this chapter to outline the complexity of the operations and highlights the importance of the study to Palabora Mining Company, hereafter refer to as PMC. Specific terms and definitions that are associated with the industry are explained and will assist with interpretation of the study.

Muscovite, biotite and phlogopite are the three most common members of the mica family. Vermiculite is a member of the mica silicates. Vermiculite has resulted from the hydration of phlogopite (and biotite) by the loss of alkali and the addition of water (Ross, Nolan, Langer, and Cooper, 1993). Vermiculite is volcanic mica compounded through evolution and has the unusual property of expanding into worm-like pieces when heated. The name was derived from the Latin vermicular that means to breed worms. Vermiculite is found throughout the world in Australia, Brazil, China, Kenya, South Africa, Zimbabwe, and the United States these countries hold commercial vermiculite mines (The Economics of Vermiculite, 2004).

South Africa accounts for over 35% of the world's crude vermiculite production and 90% of South Africa's vermiculite reserves are located in the Phalaborwa complex. Crude vermiculite is exhumed through open pit mining methods, in some cases dynamite blasting is used to loosen the ore, followed by wet or dry beneficiation processes. The resulting product normally contains up to 90% vermiculite, and is commonly available to the market in up to six grades, ranging in flake sizes from 16 mm down to 0.25 mm with a bulk density of 600 - 1505 kg/m<sup>3</sup>.

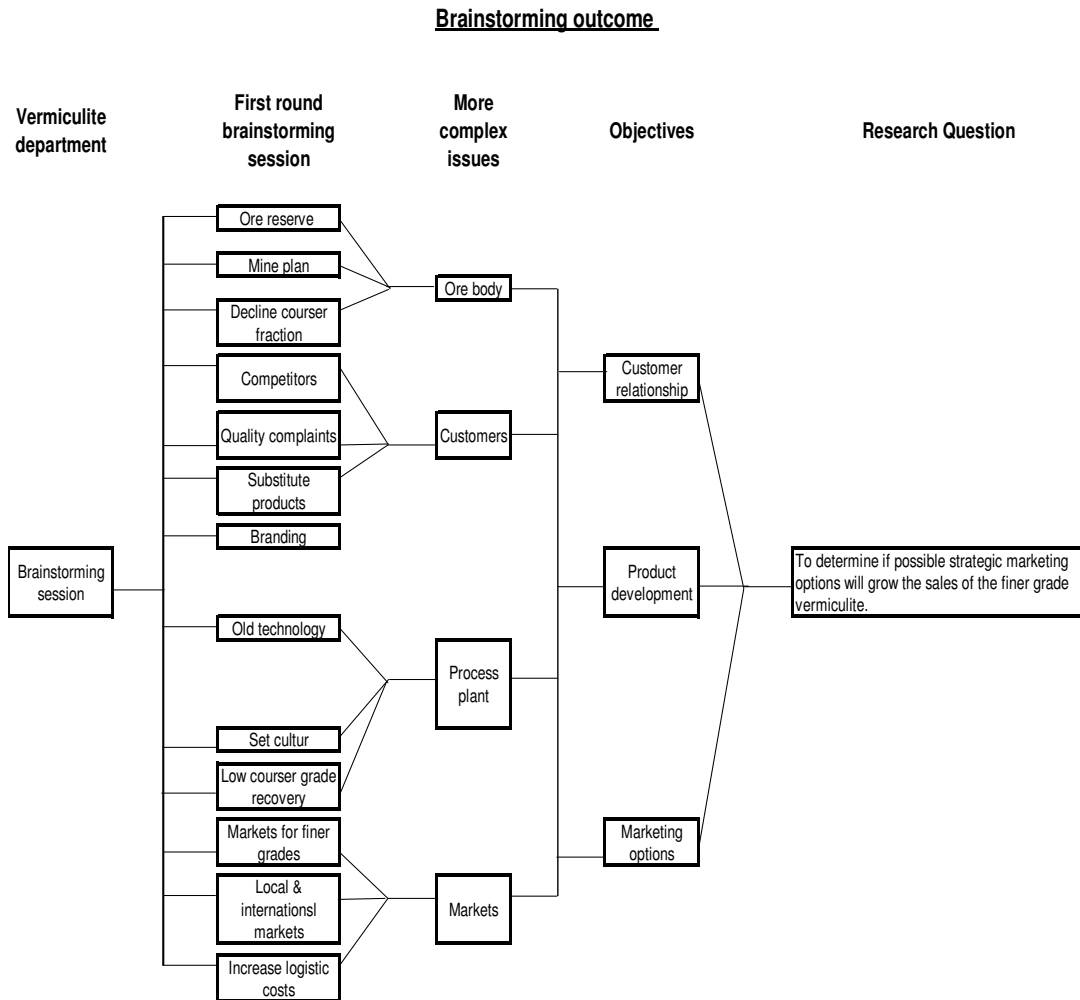
## 1.2 Background and problem in context

Dr. Hans Merensky initiated a geological survey into the occurrence of vermiculite and apatite (source of phosphate) in the Phalaborwa area. The Phalaborwa Igneous Complex (Vermiculite ore deposits) consists of two vermiculite ore bodies, VOD and the South Proximate (PP&V). The Transvaal Ore Company Ltd. acquired all the mica rights in 1939. Vermiculite mining operations commenced in 1940 and were owned by the Transvaal Ore Company located in the Limpopo Province. PMC was established in 1956 since the entire share capital of the Transvaal Ore Company was purchased with the main intent to proceed with copper mining operations (PMC archives). With the transition from vermiculite to copper in 1956 as the company's core business, the vermiculite operations have remained intact and became the world's single largest vermiculite mining operation. Palabora Vermiculite hereafter refer to as PV, produce approximately 200 000 tonnes of vermiculite annually and supply more than 35% of all crude vermiculite used worldwide (The Economics of Vermiculite, 2004).

Mining operations commenced on the rich inner serpentine core of vermiculite pit which provided high-grade easily mine-able and cheap vermiculite. The operation was capable of producing premium, large, medium, fine, superfine and micron grades. Throughout the years up and until 2005, PV was able to satisfy market demand for coarser grades (large and medium). As the vermiculite open pits became deeper the volumes of coarser grades in the ore body declines. This is leading to an increase in finer fractions delivered to the process plant. Future mining areas are available but the exploration drilling indicates that the coarseness of these ore bodies is less than the existing open pits. This is due to these areas being at the outer rim of the rich inner serpentine core of existing vermiculite pits. This will result in less coarse grade production in the future. Appendix 1 illustrates PV open pit mining area.

To get a better understanding of the entire operation and perceiving issues/problems within the vermiculite operations, brainstorming sessions were conducted. These sessions were conducted with internal colleagues in the relevant function areas, as well as colleagues from PV's subsidiaries. These sessions were conducted face to face as well as telephonic.

Figure 1.1 illustrates the brainstorming outcome and figure 1.2 illustrates the Brain map.



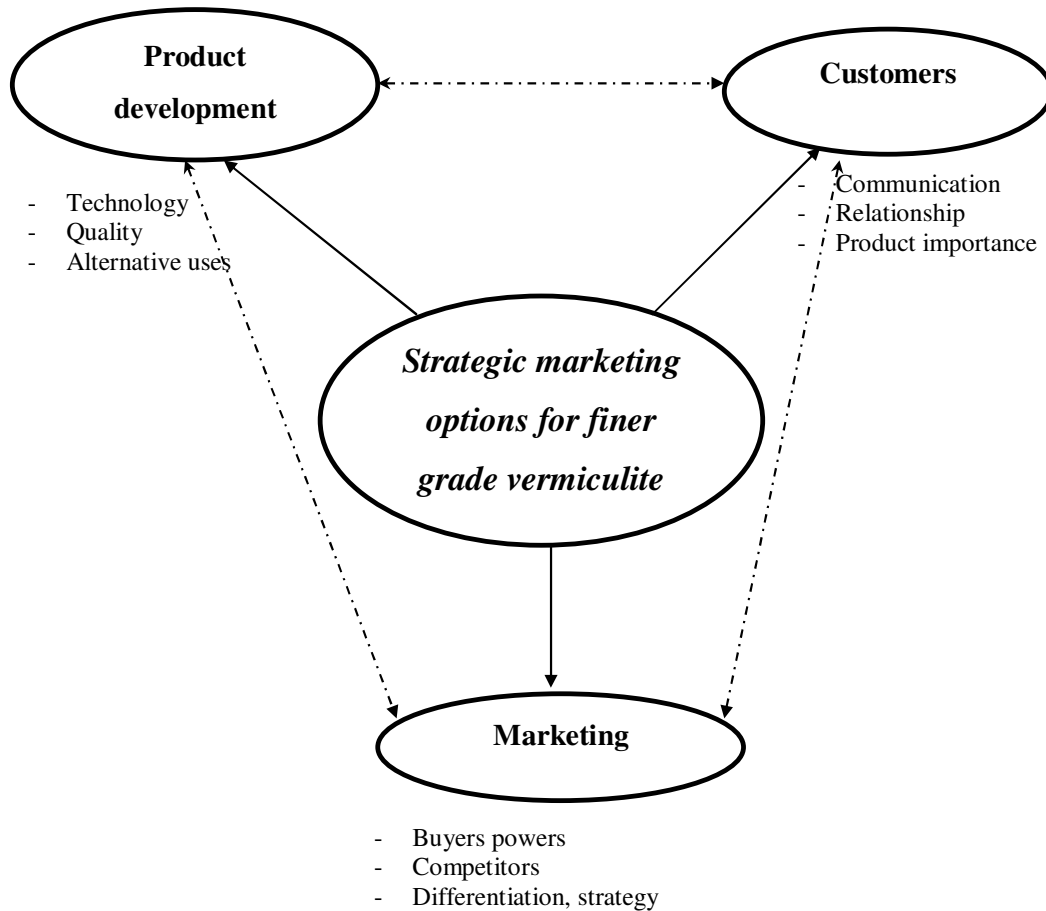
**Figure 1.1: Brainstorming outcome**

Table 1.1 illustrates the issues/problems raised during the brainstorming sessions.

**Table 1.1: Ideas and issues raised from the brainstorming sessions**

Customers	Process plant	Ore body	Marketing
Quality complaints	Old technology	Decline courser fractions	Difficult to market excess finer grades
Substitute products	Set culture	Ore reserves	Increase logistic costs
Competitors	Low courser grade recovery rate	Mine plan	Local and international markets

### Brain map



**Figure 1.2: Brain map**

## **1.3 Problem review**

### **Customer**

PV has business relationships with several American and Europe customers over the last 30 years. Reputation was built on product quality and availability. PMC has two fully owned subsidiary branches, Palabora Europe Limited (PEL) in England servicing the European and UAE related counties. PEL supplies vermiculite to customers from warehouses at Rotterdam in the Netherlands and Flixborough in the UK - this enables Palabora to offer customers a 'just-in-time' service. The American Vermiculite Corporation's offices situated in the US service American and Canadian customers. Contracts to supply vermiculite to these customers do not exist. This

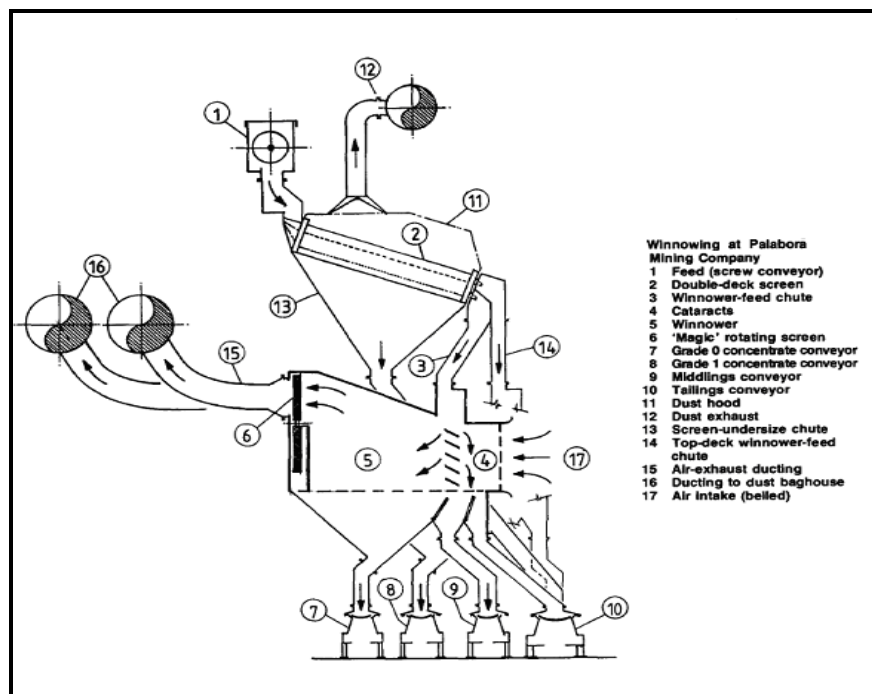
leaves PV in a vulnerable position which can lead to competitors entering their markets.

Palabora Asia Limited (PAL) is a non-legal entity based in Singapore managing the customer base in the Asian and Australian market segment. Asian customers are very stringent on product quality and delivery. All Asian and Australian customers insist on a contract with PV to secure supply of product.

Local customers are based in the Western Cape, Gauteng, Mpumalanga and Kwazulu Natal Provinces. The number of customers locally is almost the same as the number of European customers. Local vermiculite sales for 2008 were in the region of 9 340 tonnes which is only 11% of the total sales to European customers. This is an indication that the local vermiculite market is not as strong and developed as the European markets.

### Process plant

Vermiculite mining and concentration were started by the late Dr Hans Merensky at Phalaborwa during 1946. The ore is fed to the dry beneficiation plant where it is crushed, dried, screened and air classified using winnowers. Figure 1.3 illustrates the winnowing process.



**Figure 1.3: Winnowing process**

*Adapted from: Palabora Vermiculite data base*

PV is one of a few operations in the world that use a dry beneficiation process to recover all five marketable grades. Most of the operations are using a wet process to extract finer grade vermiculite (superfine and micron). The total recovery rate for the process plant was approximately 47% up and until the mid 1990's. Some of the conveying and screening circuits were upgraded and the recovery rate improved to 57%. Improvements were made to the vermiculite plant in 2006 to improve the recovery rate of the process plant. The improvement was initiated by the decline in the coarser fractions in the ore body. The process improvements resulted in 15% increase in recovery rate of finer grades and only a 3% increase in recovery rate for coarser grades. The 15% increase in recovery rate of finer grades resulted in a surplus production of superfine and micron that needs to be stockpiled on site.

### **Ore body**

According to Schoeman (1989: 7) the Palabora Complex, vermiculite has resulted from the hydration of phlogopite (and biotite) by the loss of alkali and the addition of water. Vermiculite is therefore essentially a complex hydrous silicate of magnesium and aluminium with varying amounts of iron, possibly of isomorphous replacement. The ideal formula for hydrophlogopite is given as:



South African ore reserves of vermiculite are estimated to be 80Mt with 73Mt being located at Phalaborwa (The Economics of Vermiculite, 2004: 50). At Phalaborwa all evidence indicates that surface weathering, under the influence of percolating meteoric water, was the main cause of the conversion of phlogopite to vermiculite.

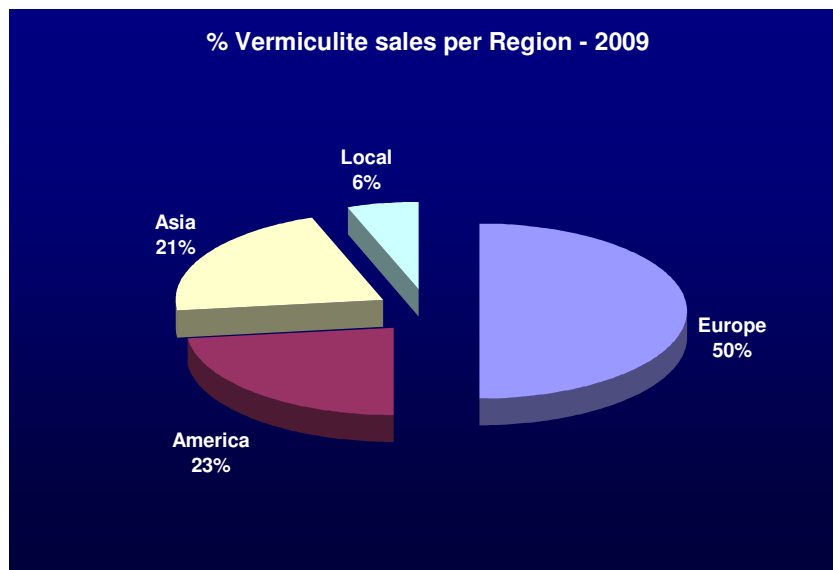
Mining operations commenced on the rich inner serpentine core of Vermiculite Operation Department (VOD) pit which provided high-grade easily mine-able and cheap vermiculite. The operation was capable of producing premium, large, medium, fine, superfine and micron grades. Throughout the years up and until 2002 PV was able to satisfy market demand for coarser grades (large and medium). As the vermiculite open pits (Shonalanga, Centre and Mpumalanga) were getting deeper the volumes of coarser grades in the ore body were declining leading to an increase in finer fractions delivered to the process plant. Future mining areas are available but the coarseness of the ore bodies are less than the existing open pits which will result in less coarse grade production in the future.

## Marketing

PV produce approximately 200 000 tonnes of vermiculite annually and supply 38% of all crude vermiculite used worldwide. PV export 94% of its products to Europe, America and Asia. Only 6% of its products are sold locally. PV's success since 1964 can be contributed to the fact that the majority of their production fell within the coarser fraction of particle size distribution.

As vermiculite is an industrial mineral and a low price commodity it is easy for competitors to enter the market and with the geographical displacement of their customers, PV has to satisfy customers by supplying a high quality product and a good service to retain them (Kotler, 2001: 15). PV has a relationship marketing approach with their bigger customers globally and transaction marketing approach with its smaller customers (Open University, 2006: 14). PV together with key customers continually collaborates to improve product quality and service delivery (improves size distribution of product and supply chain).

Europe is PV's largest market and in 2009, 50% of its total sales were to the Europe market as indicated in figure 1.4. America is PV's second largest market. The Asia markets are still new compared to the American and European markets. These markets insist on contracts to secure supply.



**Figure 1.4: Vermiculite percentage sales per Region - 2009**

*Adapted from: Palabora Vermiculite data base (2010)*

## 1.4 Problem statement/ Research question

Over the last four years the vermiculite ore body has shown a decline in courser grades fractions (large and medium). The entire plant recovery traditionally was 54% at a feed rate of approximately 6000 tonnes per day. The process technology being use in the plant is “winnowing”. This winnowing does not basically differ from the age-old proverbial process of “separating the grain from the chaff”, but here the 'chaff' is the desired commodity.

Improvements were made to the vermiculite plant in 2006 to improve the recovery rate of the plant. The improvement was initiated by the decline in the coarser fractions in the ore body. During the improvement process no new technology was introduced to the plant. The focus was based on eliminating process variation and the training of plant operators. The process improvements resulted in 15% increase in the recovery rate of finer grades (fine, superfine and micron) and only a 3% increase in recovery rate for courser grades. The recovery rate for these grades is currently running at 62%. The increase courser grades recoveries currently have no significant impact on the production output for these grades. The 15% increase in recovery rates of finer grades resulted in a surplus production of superfine and micron that needs to be stockpiled on site.

There are several issues that the vermiculite department is currently faced with derived from the information above, three core problems were identified and tested against the SMART criteria.

- The courser fractions are declining in the ore body, can the process plant by means of improvement and innovation be able to maximise the recovery rate of the courser grades?
- There is an increase in finer grade production, what strategic marketing options are available to increase the sales of these grades? Is there potential to grow this market?
- Not all the customers using courser grades demands can be fulfilled due to the decline in courser grade production. Is there a possibility that some of these customers can use finer grade vermiculite instead of the courser grades in their products/process?



## **Research question (Problem statement)**

***Will strategic marketing options grow the sales of finer grade vermiculite?***

### **Objectives**

- To determine why the customers prefer coarser grades.
- To investigate potential alternative uses for finer grades.
- To determine how the finer grades can be marketed to current users of coarser grades.

### **1.5 Importance of the research to Palabora Vermiculite**

In order for PV to stay ahead of competition and to further enhance the company's position as the market leader in today's changing environment, this research will indeed outline the key issues PV should consider for future business. As outlined in the problem statement summary, the key strategic issues faced by PV and more so the threat to the continued existence of PV, will be exposed and highlighted.

### **1.6 Research limitations**

Definite boundaries exist within the research study due to geographical displacement in the majority of vermiculite consumers across the world. The problematic issue of supplier and customer loyalty in an intense competitive industry has proved to have inherited barriers to competitor specific information, thus the reliance on secondary data with regards to competitor's mining capability, crude production and competitive advantages.

### **1.7 Summary**

Each industry, irrespective of the nature of the product produced, should always be watchful of changes within the environment it is active in, since any change no matter how big or small has an effect on its overall performance and success. This research will be an acknowledgment of the changes currently experienced within the PV operation.

Chapter two is dedicated to outline the problem analysis/ theoretical considerations that include the use of business theories and models to gain a broader understanding of the issues around the problem.

## **CHAPTER 2**

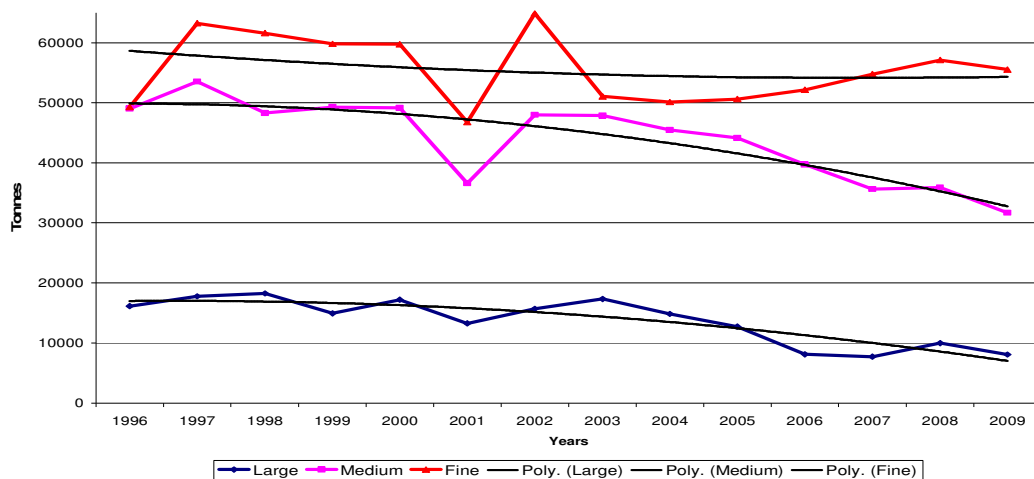
### **2. Problem analysis / theoretical consideration**

#### **2.1 Introduction**

In the problem statement it is mentioned that the coarseness in the vermiculite ore body is declining and PV cannot satisfy its coarser grade customer's needs. Large and medium grade production is declining at a steady rate since 2003 as indicated in figure 2.1. The coarseness determines the size distribution of the vermiculite flakes. The higher the coarseness factor the higher the volumes of coarser grades in the ore that is supplied to the process plant. Due to the decline in the ore body's coarseness, finer grade ore is supplied to the process plant, leading to an increase in finer grade production. Figure 2.2 illustrates an increase in finer grade production since 2003. Due to this, the supply of finer grades exceeds the demand, causing the company to stockpile excess product onsite.

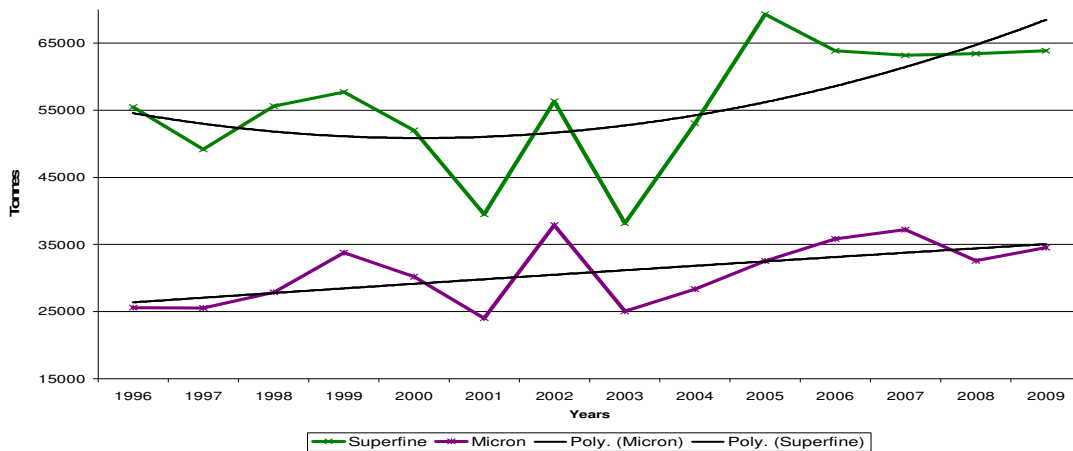
There are several strategic issues that the vermiculite operation is currently faced with, and the primary aim of the research is pointed out below:

- To determine why the customers prefer coarser grades.
- To investigate potential alternative uses for finer grades.
- To determine how the finer grades can be marketed to current users of coarser grades.



**Figure 2.1: Coarser grades production (large, medium and fine) from 1996 to 2009**

*Adapted from: Palabora Vermiculite data base (2010)*

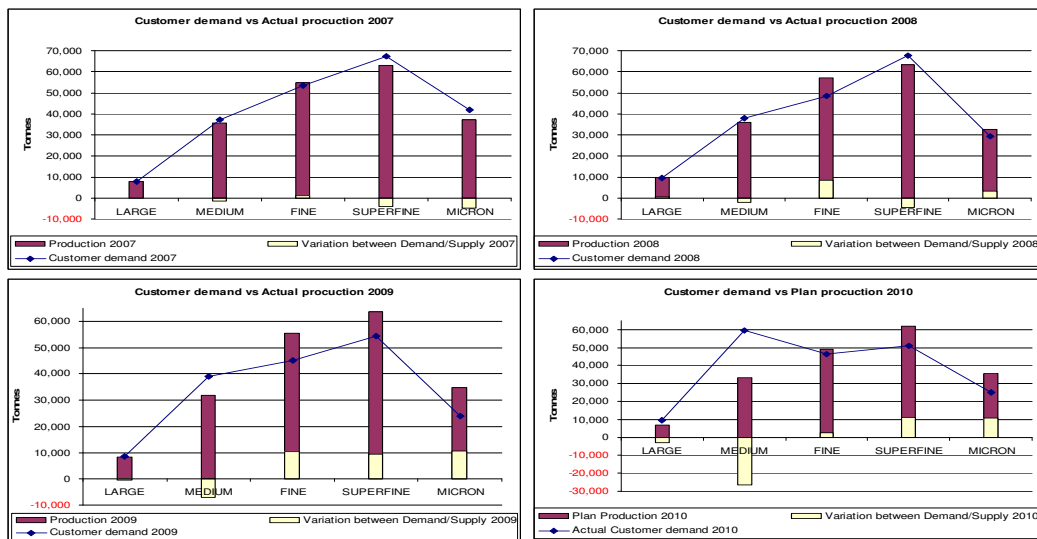


**Figure 2.2: Finer grades production (superfine and micron) from 1996 to 2009**

*Adapted from: Palabora Vermiculite data base (2010)*

### Finer grade inventories increased

For the last few years PV's finer grades inventories onsite increased and management believe it is due to the plant improvements which resulted in an increase in production of the finer grades. The question that needs to be asked is it only due to production increase that the company has to stockpile excess finer grades or is there another reason for this? To determine this, one need to look at the history of what the customer's demands were comparing with what was produced. Due to availability of information on customer demands only four years data was used. Figure 2.3 illustrates the customer demand versus actual production from 2007 to 2010 plan.



**Figure 2.3: Customer demand versus actual production from 2007 to 2010 plan**

*Adapted from: Palabora Vermiculite data base (2010)*

Looking at figure 2.3 one can see that the demand for superfine has decreased from just over 67 000 tonnes per annum for 2007/2008 to 50 000 tonnes for 2010. This is approximately 25% reduction in demand. The same is evident for micron with a decrease in demand of more than 40% between 2007 and 2010. The demand for large and fine grades is more or less constant throughout the years. Medium grade demand for 2007 to 2009 was constant and only in 2010 the customer demand increase substantially, is there a reason for this?

To gain a broader understanding of the issues surrounding the problem I will be looking at each key issues (objectives) as outlined above.

## **2.2 Determine why customers prefer coarser grades**

For PV to address the issues they face, they need to understand their customer's business, e.g. what market they compete in, the process they use to produce their final product, what their future market predictions are for their product and why do their customers prefer their product. PV delivers vermiculite to a number of customers based in Europe and America since 1964. For these customers PV is the preferred supplier of vermiculite due to quality and availability. Most of them are family owned businesses passed on from generation to generation. PV has a relationship marketing approach with most of the Europe and American customers and transaction marketing approach with its Asian and local customers as described by Kotler, (2000: 13).

Almost 70% of the Europe and American customers are purchasing large and/or medium to use in their process or products they sell. Large and medium is used in a horticultural application due to its excellent property of improving soil aeration while retaining moisture and nutrients to feed roots, cuttings and seeds for faster, maximum growth (The Vermiculite Association, 2010). Customers who are in the horticultural application business claim that their customers purchase their products on how it looks. The coarser the product the better it works. Ritzer (2009) has argued that consumption is separated from production, logically, because two different consumers are involved. In the first case consumption is by the primary individual; in the second case, a producer might make something that he would not consume himself. Therefore, different motivations and abilities are involved. PV customers are

producing a final product which they would not consume themselves. The focus should be on a consumer rather than a “customer.”

According to Galles (2007), preferences and circumstances differ, and anything that could alter the value of the expected marginal benefits or the marginal opportunity costs of a choice to a decision maker could change what people deem efficient. According to Boztepe (2007: 7), the value of a product is not only relative to the context but also to the alternative products users are acquainted with.

There are several approaches in preferential choice studies, one of which is the multi-attributed modelling approach. Benefits of adopting the multi-attribute modelling approach is such as its potential insights to consumer’s cognitive processes and its pragmatic values to industry were listed in past streams of research (Muthitacharoen, Gillenson & Suwan, 2006: 679). Muthitacharoen *et al*, (2006: 679) indicated that within the domain of the multi-attribute modelling approach, two concepts of preference development have emerged. They are Attribute-Based Preference and Attitude-Based Preference. The first approach suggests that preference formation involves comparing specific attributes (Attribute-Based Preference), while the second approach indicates the overall evaluation of alternatives (Attitude-Based Preference). This model can be use to compare PV customers alternatives in detail.

## **2.3 Investigate potential alternative uses for finer grades**

PV used to be the leader in research and development in the vermiculite industry until mid 1990 when they sold their research and development division, Mandoval vermiculite, losing patent rights and trade secrets. The management of PMC at the time did not see the research and development division of PV as part of the core business. The focus was on producing crude vermiculite and to improve their relationship with their customers whereas research and development was left to the customers.

For PV to stay ahead of competition and to enhance the company’s position as the market leader of vermiculite in today’s changing environment, the company need to consider product innovation or product development. Product innovation involves the

introduction of a new product that is new or substantially improved (Open University, 2006: 41).

Igor Ansoff (1957) has developed a framework that aims to assist management in this analysis. This framework is known as “The Ansoff matrix”. Table 2.1 illustrates the Ansoff matrix which entails four possible product/market combinations: Market penetration, product development, market development and diversification. Ansoff’s matrix is a useful framework for looking at possible strategies to reduce the gap between where the company may be without a change in strategy and where the company want to be. For PV to look into alternative uses for the finer grades they will have to look at product development. Product development refers to significant new product developments and not minor changes in an existing product of the company. According to Lynch (2003) the reasons that justify the use of this strategy include one or more of the following: to utilise the excess production capacity, counter competitive entry, maintain the company’s reputation as a product innovator, exploit new technology, and to protect overall market share.

**Table 2.1: Ansoff Matrix**

*Adapted from: <http://tutor2u.net>*

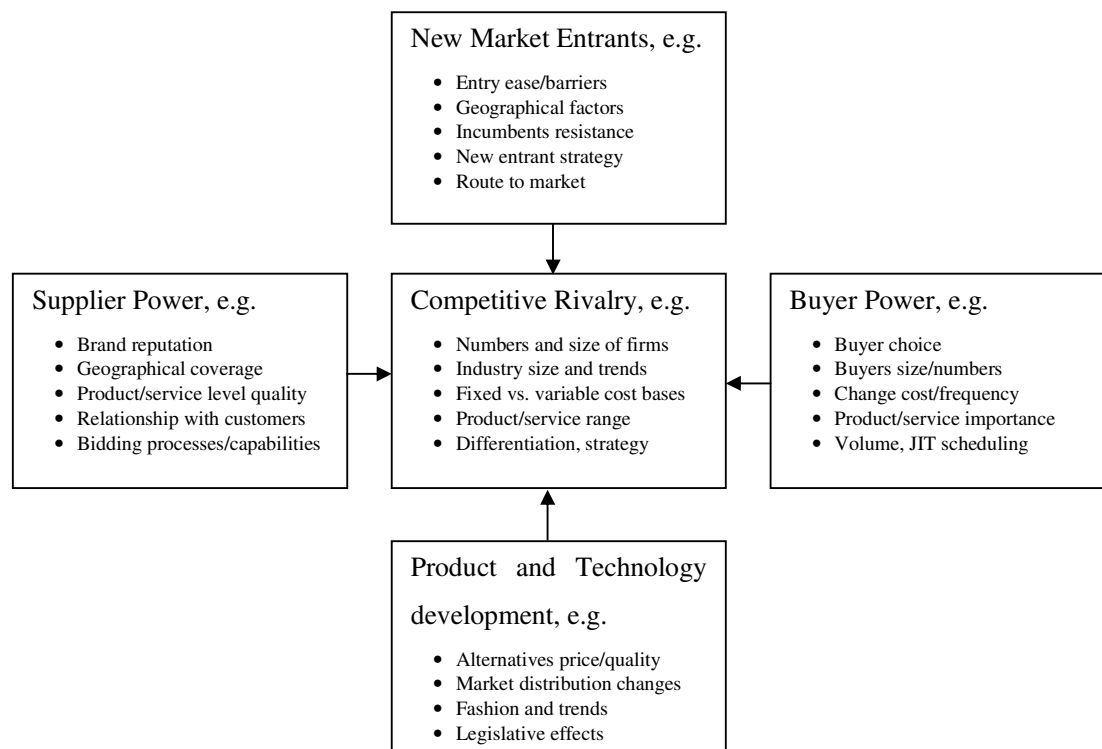
	<i>Existing product</i>	<i>New Product</i>
<b>Existing markets</b>	<b>Market penetration</b> <i>Increase sales to the existing market.</i> <i>Penetrate more deeply into the existing market.</i>	<b>Product development</b> <i>New product development for existing markets.</i>
<b>New markets</b>	<b>Market development</b> <i>Existing product sold to new markets</i>	<b>Diversification</b> <i>New products sold in new markets</i>

## **2.4 How the finer grades can be marketed to current users of coarser grades.**

From the information in figure 2.3 it is evident that the demand for finer grades has declined in the last three years and one need to asked the questions, are the

customers purchasing from other suppliers, have they change their process, did they scale down, do they use a substitute product or is the product our customer produce losing market share. PV is losing market share and it might be linked to several reasons i.e. pricing, competitor's products are improving and the availability of material from competitors is increasing. Managers are faced to analyse competitive forces in an industry environment in order to identify the opportunities and threats confronting a company.

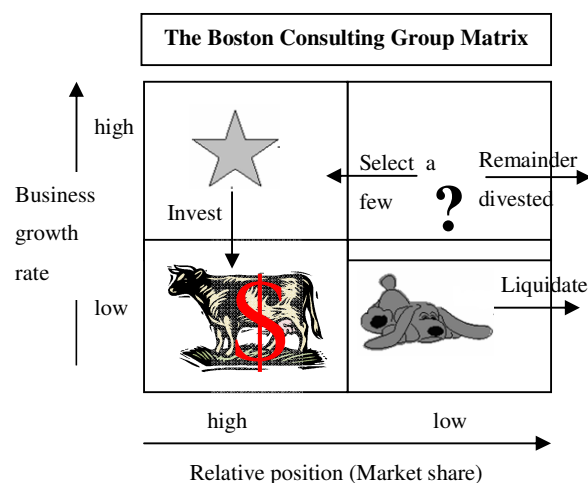
Michel Porter (1980) has developed a framework that aims to assist management in this analysis. This framework is known as “The five forces model”. Figure 2.4 illustrates factors influencing company marketing strategy. Porter has identified five competitive forces that shape every industry and every market. These forces determine the intensity of competition and hence the profitability and attractiveness of an industry. Porter's model supports analysis of the driving forces in an industry. Based on the information derived from the Five Forces Analysis, management can decide how to influence or to exploit particular characteristics of their industry.



**Figure 2.4: Porter's Five Forces**

*Adapted from: Grant, (2008:73)*

To get a helicopter view of the PV business, Ward (2005: 7), proposes one needs to look at the Boston Consulting Group's (BCG) Growth Share Matrix which is like the Ansoff Matrix. It is generally used to analyse the standing of single business unit or company enterprise. The analysis is based on the combination of two dimensions: Business Growth and Market Share. This model can be used to determine what priorities should be given in the product portfolio of the PV business. The idea is that the bigger the market share the product has, the more cash it can earn, and the faster the product grows, the more investments are needed (Ward, 2005: 7). Figure 2.5 illustrates the Boston Consulting Group's (BCG) Growth Share Matrix.



**Figure 2.5: Boston Consulting Group's (BCG) Growth Share Matrix**

*Adapted from: Ward (2005: 7)*

From the above a gap analysis can be conducted which is a very useful tool in helping marketing managers to decide upon marketing strategies and tactics. The simple tools are the most effective and there's a straightforward structure to follow. The first step is to decide upon how you are going to judge the gap over time.

### **Strategic gap closing options**

For PV to close the gap between where they are and where they want to be, internal and external factors that can influence the business should be analysed and evaluated. The basic analytical techniques management can use are the strength, weakness, opportunities and threats analysis (SWOT), value chain analysis, strategic cost analysis and competitive strength assessment. Focus should be placed on the identification of the firm's strengths, weaknesses, opportunity and



threats. It is, however, important to have insight of their definitions for adequate identification. The aim of any SWOT analysis is to isolate the key 'issues' that will be important to the future of the organisation which will assist in better marketing planning.

## **2.5 Summary**

It can be concluded that the issues facing PV is much larger than just the internal issues they are facing. The coarser grades in the ore body are declining and at the same time the demand for finer grades are deteriorating. Different models and frameworks are available to analyse and evaluate the company's position in the market, locally and internationally. From these analyses and evaluations management can make strategic decisions in which direction they want to steer the vermiculite business. The following chapter will review what the guru's have to say on customer's preferences, product innovation and development, strategic gap analysis and strategic marketing options.

## **CHAPTER 3**

### **3. Literature Review**

#### **3.1 Introduction**

Chapter three includes a literature review in support of the strategic management issues identified in the problem statements. The review describes theoretical perspectives and previous research findings regarding the problem at hand. Its function is to “look again” (re + view) at what others have done in areas that are similar, though not necessarily identical to, one's own area of investigation (Leedy and Ormrod, 2005: 64). The theoretical view of customer preferences, product development and innovation, strategic gap analysis and strategic marketing options will be discussed.

#### **3.2 Customer preference**

As mentioned in the problem analysis PV needs to understand and be familiar with the real reason/s why customers are using a specific vermiculite grades. Will the customers be able to use a different grade of vermiculite in their process or product? Do customers have preferences that can be ascertained? According to Kwon, Cho, & Park (2009) a traditional perspective to studying customers decisions, mostly attributed to economists, makes the common assumptions that “each individual has stable and coherent preferences” and that “people know their preferences” That is, one of the implied assumptions of this economic perspective is that customers know what they like and are able to make choices among options based on these underlying well-defined, pre-existing preferences.

According to Simonson (2005) the studies done on preference construction, has agreed that customers' preferences develop with growth in their familiarity with or experience of a specific product. He also claims that people's preferences are likely to be stable over time, and people are likely to be well aware of their preferences. If customers have stable, pre-existing preferences and they know their preference well, they may appreciate the offers that providers customize after uncovering the

preferences, whereas they may not do so if they have not. If the recommended offers based on the revealed preferences do not conform to the actual preferences, it might be ascribed to the customers' unstable preferences rather than to a problem in the preference elicitation or recommendation algorithm (Simonson, 2005: 32-45).

However, Kwon *et al* (2009: 263) claimed that recent customer psychological research on the construction of preferences suggests that customers often do not have well-defined, pre-existing preferences that are merely revealed; instead, they construct their preferences as they make choices. With this argument PV might find it difficult to determine specific customer's preferences because they may not have well-defined preferences.

Muthitacharoen *et al*, (2006) conducted a study of online consumer behaviour using the multi-attribute modelling approach as discussed previously. The study strived to extend current knowledge in this area by examining the role of business sales channel strategies in consumers' sales channel preferences. Their study also provided concrete examples of how consumer preferences of sales channels are developed and influenced by business strategies of using sales channels. The study proposed a version of Attribute-Based Preference and its relationship with Attitude-Based Preference. The study defines four attributes:

- **Transaction Cost Preference:** The ability to provide its customers with favourable product price and other financial transaction costs (i.e. shipping cost, sales taxes, etc.) occurring during the purchasing process.
- **Product Preference:** The ability to provide its customers with a favourable product at the point of purchase, including variety, selection, and availability of product.
- **Social Interaction Preference:** The ability to provide its customers with interactive communications and a supportive sales environment.
- **Risk Preference:** A higher degree of personal risk inherently stemmed from the use of a sales channel to make purchases.

(Muthitacharoen *et al*, 2006: 680)

From their study they determine that risk preference was the most important attribute in the process of preference development and found that business strategies play an important role in the consumer preference development process.

### **3.3 Product development / innovation and alternative uses**

For a company to be competitive they need to ensure they stay ahead of their competitors with product development and innovation, some companies more than others. Companies marketing industrial minerals (i.e. vermiculite) need to look at alternative uses for their products if they want to stay competitive and not lose market share. Vermiculite is a low cost commodity and companies have to sell large volumes to be profitable.

#### ***Customer's involvement***

In a global competitive era, customers are becoming vital role players in the manufacturing or research and development (R&D) process and companies should invite customer to form part of the R&D process and ultimately treat customers as partners. Alam (2006), describe customer involvement as product/service providers and current/potential customers jointly engage in innovation projects, and exchange ideas to anticipate customer's demands and develop new product/services.

According to Flint (2002: 305), many organisations do not know what kinds of customer information they ought to be collecting, do not have the skills to do so even when they do know, do not have formal processes designed to capture important customer information, and/or are in too much of a hurry to move from ideation (i.e. idea generation) and screening to development phases of new product development. He suggest that many of the new product ideas floating around firms these days may be unhelpful at best and harmful at worst because they are internally generated creative ideas not well founded in customer understanding that act more as distractions than sources of meaningful opportunities. He argues that managers who are well informed about the marketplace and in particular customers are more likely to envision realistic and meaningful new product ideas than those managers who are less market-oriented. Consistent market understanding best comes from formal processes designed to generate market intelligence and not from merely ad-hoc interactions with the marketplace (Flint, 2002: 306).

Eng and Quaia (2009: 276) developed a table that provides an overview of main theoretical concepts used in previous studies for improving new product adoption. Appendix 2 illustrates the theoretical underpinnings of new product adoption in

uncertain environments. One of the concepts in the table is market orientation which is focused on customers, competitors and inter-functional coordination and promotes information sharing and market intelligence that are critical in the early stages of a new product. In their study they indicated that communication within the organisation and with customers reduces uncertainties and poor communication with customers could lead to purchase decision based on past experience.

### ***Customer requirements***

According to Yadav and Goel (2008: 1000) an essential and key step in the product development process is the identification of customer requirements. They emphasise that when gathering customer requirements, it is important to capture the right kinds of information, which is really necessary to successfully implement quality improvement tasks. Any quality improvement effort is directed towards customer satisfaction. According to them there are various tools and techniques available to capture customer requirements and expectations i.e. intensive personal interviews, focus group discussion, expert interviews, customer surveys via paper and pencil, or via internet, trend analysis, and scenario approaches (Yadav and Goel, 2008:1001).

Ulwick, (2002) identifies the main problem with using customers input for innovation as; customer will tend to provide solutions instead of desired outcome. He claims that their solution space is very small with only little insight in the possibilities of the given industry and its supply chains. Customers will unlikely be asked for solutions which include emerging materials and technologies which they do not know of yet. According to Ulwick, in best case scenarios the customer input can lead to incremental improvements of products already in the market as long as one keeps asking the customers for solutions instead of what outcomes they would like to be improved. He has identified three distinct types of information that must be captured from the customer to identify the real customer requirements:

- “jobs” customers are trying to get done when using a product or service,
- the “outcomes” they are trying to achieve when performing these jobs in a variety of circumstances, and
- the “constraints” that stand in the way of them adopting or using the product.

### ***Product development / innovation***

According to Linneman, Verkerk & Boekle (2006: 185), in a consumer-orientated approach new product development will start with consumer and market research to identify the specific characteristics that a new product has to have. The next step is to realise co-operation and information exchange among all the actors in the production chain. This gives rise to several new issues, like the question how the descriptive and qualitative terminology in which consumers express themselves can be translated into technological specifications.

Innovation capability constitutes the link between the company and the dynamic environment of the industry (Isik, Arditi, Dikmen & Birgonul, 2009: 630). The vermiculite industry is not static and introverted any more. Globalisation and higher rates of competition between companies force vermiculite companies to change. Innovation capability is an important factor in achieving cost leadership, focus, and differentiation, hence enhancing competitiveness (Isik, Arditi, Dikmen & Birgonul, 2009: 631).

## **3.4 Marketing strategies**

### ***Strategic gap analysis***

After sufficient industry, market environment and organisational specific data has been gathered and analysed, this will allow management to know exactly where their organisation is situated in the market they compete in. Company's strengths and weaknesses should be known, as well as industry opportunities and threats that will have identified gaps between the current performance of the organisation and the desired performance required for the successful realisation of its strategic business model. Furthermore, the gap analysis requires the development of specific strategies to each gap identified. The importance of the gap analysis as indicated by Johnson and Scholes (1999:366) clearly contrasts the organisation's wants against reality.

Benchmarking performance measurements (Johnson and Scholes, 1999:181) may be used to conduct a gap analysis. This can be achieved through projection of a company's performance on the basis that it continues to follow existing policies. The resulting level of profitability, rate of return and rates of profit growth, should be compared with the benchmarks and the gap between these calculated. In order to

use this premises of the gap analysis, it is necessary to project the profit consequences of continuing to pursue existing strategies and the consequences of alternative proposals to fill the gaps. The projection and comparison of different courses of action for a firm can be facilitated through computerised corporate financial models.

An interesting observation was made from Stacey's (1996) view in establishing gaps within the business through financial modelling. The single most important objective of every profit seeking organisation should be to generate as much profit as possible and increase shareholders value. Thus, the importance for the projection of an organisations future should be, not to change any aspects of the business, pursue no new product development, market penetration, cost reduction schemes and so on, as this is the best way of highlighting gaps within the firm. The added advantage of the computerised modelling is the fact that what if scenarios can be simulated, especially with reference to foreign currency changes experienced in the South African exporters market. The expected outcome of the gap analysis is a strategic plan that has a reasonable probability of success. The purpose of the analysis is to bring the test of the current reality that organisations experience to the dream of tomorrow. Goodstein et al. (1993: 263) has identified five basic approaches in analysing the gap, as depicted in table 3.1, through detailed examination of the distance between each element of the strategic business model and the current state of the firm, as revealed in the environmental audit.

**Table 3.1: Specific key questions to be answered during the gap analysis**

*Adapted from: Goodstein, Nolan and Pfeiffer. (1993: 263)*

1. How does your desired strategic profile compare with the current one?
2. How does your planned line of business fit with your existing ones and with your resources, both current and planned, bring them on line?
3. Where does the organisation stand with regards to their current critical success indicators and what do they tell us about the capacity to meet new ones?
4. What are the current strategies of the firm and what do they tell management about the capability to execute new ones?
5. How different is the existing culture from the required one?

### ***Strategic marketing options***

Kotler (2000: 74) discussed how Ansoff has proposed a useful framework for detecting new intensive growth opportunities called a product-market expansion grid as illustrated in table 2.1. The company first considers whether it could gain more market share with its current products in their current markets (market-penetration strategy). Next it considers whether it can find or develop new markets for its current products (market-development strategy). Then it considers whether it can develop new products of potential interest to its current markets (product-development strategy). Later it will also review opportunities to develop new products for new markets-diversification strategy. Looking at product development Kotler suggest three approaches management can look at new markets whose needs might be met by its current products (Kotler, 2000: 74).

- Identify potential user groups in the current sales areas.
- Seek additional distribution channels.
- Consider selling in new locations in its home country or abroad.

Ansoff analysis helps in mapping the strategic options for companies, it is important to note that like all models, it has some limitations. By itself, the matrix can tell one part of the strategy story but it is imperative to look at other strategic models like SWOT analysis and PESTLE in order to view how the strategy of an organisation is formulating and might change in the course of its future. It is imperative to the market analysis to assess a company's strengths and weaknesses to determine whether and how the opportunities may be exploited.

As discussed earlier in the problem analysis, Porter's five forces model was design to assist managers analysing external environment of their companies. The centre point of the model is dominated by competition between established companies within an industry while the outer four forces have direct impact on these firms. The model assumes that suppliers, buyers, potential entrants and substitute products affect the intensity of competitive rivalry among existing firms and the collective strength of the five forces determines the sectoral competition level (SCL) of the organisation (Dagdeviren, Yüksel, 2010: 1005). Management with effective strategies should carefully react upon the analysis of the potential threats and opportunities posed by the outer-rimed forces. The two forces the author values the most in this model is the threat of substitute products and potential competitors that



can be exploited through some manipulation by management in creating barriers of entry to future competitors.

***Identifying and evaluating opportunities, threat, strengths and weaknesses for strategic gap closing options***

According to Chang and Huang (2006: 258) the SWOT analysis of external opportunities and threats as well as the internal strengths and weaknesses of the enterprises is important for strategy formulation and development. The purpose of the analysis of external opportunities and threats is to evaluate whether an enterprise can seize opportunities and avoid threats when facing an uncontrollable external environment, such as fluctuating prices, political destabilization, social transition, change in the rule of law, etc. The purpose of the analysis of internal strengths and weaknesses is to evaluate how an enterprise carries out its internal work, such as management, work efficiency, research and development, etc. If used correctly, SWOT can provide a good basis for successful strategy formulation (Chang and Huang, 2006: 258).

John Pearce and Richard Robinson's definition of opportunity and threats is not as descriptive as Chang and Huang but the importance is very clear. They define an opportunity as a major favourable situation and a threat as a major unfavourable situation with in a firm's environment. Pearce and Robinson (1997:171) Market opportunities and threats is a big factor in shaping a company's strategy since they not only affect the attractiveness of a company situation, but point out the need for strategic action. Key trends could be one source of opportunities such as overlooked market segments, changes in competitive or regulatory circumstances, technological changes, and improved buyer and supplier relationships. The following key impediments to the firm's current or desired future, such as the entrance of new competitors, slow market growth, increased bargaining power of key buyers or suppliers, technological changes, and new or revised regulations, could be presented as threats to a firm. From these examples it can be seen that similarities exist within the variables that make up opportunities and threats.

The importance for the analysis of past trends in a firm's sale, costs and profitability is of major importance in the identifying of its strategic internal forces. According to (Pearce & Robinson, 1997) sales trends should be broken down by product line and

the channel of distribution. A detailed investigation of the firm's performance history trends should allow management to isolate the internal factors that influences its sales, cost and profitability. However, there is a direct relationship between the results of the internal trend analysis and the external forces that affect these results. In most cases the economical and political environments are the major influences of internal factors of globalise organisations, as will be seen in sales and profitability analysis of PV business. Theoretically there are several ways to close the gap between the organisation's current state and its desired future state. According to Goodstein *et al.* (1993) these options will generally either fall into a growth or retrenchment category, depending on the relationship of the current organisation and its desired future. The essence to understand what the key opportunities and threats are facing a firm, helps management identify realistic options from which to choose appropriate strategies.

### **3.5 Summary**

It can be concluded that organisational success can be contributed to well defined and superbly executed strategies according to prevailing environmental situations. For the company to stay competitive product development and innovation is very important in the short-term as well as in the long-term. Companies should employ the fundamentals of strategic management through portfolio and strategic gap analysis to firstly, establish where the organisation is currently positioned in a market (strength and weaknesses) and secondly acknowledge the threats and opportunities faced within the enterprise. Selecting the right strategy to ensure that the organisation is successful with regards to short, medium and long term objectives, the evaluation and identification of different marketing strategy for different vermiculite grades are of the utmost importance, since the availability of each grade will guide the organisation towards strategic options.

## **CHAPTER 4**

### **4. Research Design and Methodology**

#### **4.1 Introduction**

Cooper and Schindler, (2001: 75) describe research design as the blueprint for fulfilling objectives and answering questions. According to Leedy and Ormrod, (2005: 93) data and methodology are inextricably interdependent. For this reason, the methodology to be used for a particular research problem must always take into account the nature of the data that will be collected in the resolution of the problem. There are two research design approaches namely qualitative and quantitative. Qualitative research involves analysis of data such as words (e.g., from interviews), pictures (e.g., video), or objects (e.g., an artifact). Quantitative research is an inquiry into an identified problem, based on testing a theory, measured with numbers, and analyzed using statistical techniques. The goal of quantitative methods is to determine whether the predictive generalizations of a theory hold true (Leedy and Ormrod, 2005: 95).

The information gathered will be used to identify and define customer's preference, alternative uses for finer grade vermiculite and marketing opportunities to increase vermiculite sales. The methodology relies on exploratory as well as qualitative research that is based on seeking in-depth, open-ended responses through one-on-one interviews, telephonic interviews and specific questionnaires that utilises close and open-ended questions. Brady, Collier & Seawright (2006: 355) have argued that "causal process observations" can be adjoined to "data set observations." This implies that qualitative methods can be used to add information to problematic quantitative data sets and hence can solve quantitative research design issues. An explanatory study goes beyond description and attempts to explain the reasons for the phenomenon that the descriptive study only observed (Cooper and Schindler, 2001: 13). The Sample characteristics are discussed with focus sited on stratified sampling procedures, which allow for the proportional allocation of sample size to each identified group. Data analysis techniques used for the research, are highlighted with specific mention of the descriptive approach that draws upon a graphical nature.

## 4.2 Aims of Research

The aim of this research is to gather relevant data from within the PV markets, including qualitative and quantitative data, which will concentrate on analysing the following specific problems mentioned.

- To determine why the customers prefer coarser grades.
- To investigate potential alternative uses for finer grades.
- To determine how the finer grades can be marketed to current users of coarser grades.

From the analysis, with the consideration of underlining opportunities and threats, management should be able to construct strategies with more confidence and less risk for short and long-term success for the vermiculite business. The study is aimed at identifying ways of improving the sales of finer grades vermiculite.

## 4.3 Research design

### The nature of the research

The reason why a qualitative research nature was selected is due to its ability to allow respondents to speak freely about the chosen subject, and its ability to obtain the widest possible responses. Since any type of research that would provide management with ideas and insight (broad and/or vague), exploratory research can be classified as such, as indicated by Cooper *et al.* (2001: 13).

## 4.4 Data gathering procedures

To identify and highlight strategic management issues inherent to vermiculite business the following data gathering procedures were adopted.

1. Primary data collection (internal & external) - questionnaires as well as focus group discussions.
2. Secondary data collection (internal) - annual sales reports of Palabora vermiculite.
3. Secondary data collection (external) - international market information on competitors mining capabilities and competitive advantages.
4. The collection of historical data, pertaining to annual world production, relied solely on published production records.

## Focus group discussions (Primary Data)

The primary aim of the focus group discussion is to investigate the reasons why certain customers prefer coarser grade vermiculite, alternative uses for finer grades and marketing strategy to increase finer grade sales. Table 4.1 illustrate the list of subsidiaries within PMC for the focus group discussions. The reason for selecting the particular individuals is they are seen as committed participants. Committed participants are those respondents who are uniquely qualified to provide the desired information that is required. The individuals will be able to truthfully answer all questions and have some personal experience of the research topic. Thoughts were directed towards their customers in each of their respective geographical market area. Discussions took place to identify marketing strategies to improve the sales of finer grade vermiculite.

**Table 4.1: List of subsidiaries**

Company	Region
Palabora Vermiculite	South Africa
Palabora America Limited	America
Palabora Asia Pacific	Asia
Palabora Europe Limited	Europe

## Questionnaire design (Primary Data)

### *South African consumers*

The aim of the questionnaire is to gather quantifiable data of what local customers opinions are with regards to customer product preference, future growth opportunities and barriers restricting them to grow. Growth attribute selected were product grades availability, end applications produced and a number of initial enquiries received during the last two years on using vermiculite as a substitute product for asbestos. A copy of the questionnaire is reflected in Appendix 4. Inductive (start with closed (detailed) questions and end with open-ended questions) approach was used when ordering questions. The format of responses that was used in the questionnaire was dichotomous (a question offering a choice of two answers), normal (values have no referential or positional meaning), likert scale (the customer is presented with a statement and is required to indicate their level of

agreement) and rating (a scale defined for rating the importance of a specific attribute) (Kelly, 2003: 4)

### ***International customers***

This questionnaire was designed at gathering quantifiable specific data from international customers in researching customer product preference, use of competitor's/substitute products, vermiculite application by country, future growth opportunities and barriers restricting them from growing there business. Europe and America customers make use of central warehousing facilities whereas the Canadian and Asia customers are serviced with direct shipments, which add to the difficulty of on time delivery to such a huge geographically displaced market segment. Questions asked were constructed to establish whether having central warehousing being convenient and advantages in the case of European and American customers. Concerning Canadian and Asia customers who have a complex supply chain, questions asked were constructed to establish whether having central warehousing will be beneficial to them. Results pertaining to this question are critical with regards to competitors and substitute products. The format of responses that was used in the questionnaire was dichotomous (a question offering a choice of two answers), normal (values have no referential or positional meaning), and rating (a scale defined for rating the importance of a specific attribute) (Kelly, 2003: 4)

Insuring that all responses are received back from customers as well as being valid and reliable, a special effort will be made by sending questionnaires electronically to the sample population and followed up telephonically, explaining the context of the questionnaire in detail. Appendix 5 reflects a copy of the questionnaire sent to the sample group.

### **Market related data gathering (Secondary Data)**

Internal secondary data source of company records, with regards to PV product range sales volume history, was exploited in constructing PV vermiculite local and international market situation.

## 4.5 Characteristics of the sample

Non-probability convenient sampling will be used for selecting respondents in gathering primary data on the basis of convenience and availability. Respondents selected for the focus group discussions, as reflected in table 4.1, are purely based on employment by PMC and the various major market segment representations. It is, however, important to mention that the attendance to the focus group respondents, are made possible, since the focus group discussion is scheduled to take place during a quarterly strategic planning meeting in the third week of March 2010. Sample population selected for the South African market will rely on probability convenient sampling, specified by selecting all PV active local customers. However, bearing in mind that PV is the sole supplier of vermiculite in South Africa, thus the whole sample population being included in the study for this specific market segment. Sample population selected for the international markets also relies on non-probability convenient sampling, specified by, customer purchasing more than 1000 tonnes of vermiculite per annum.

### **Scope of the sample for secondary data collection relating to PV and other Vermiculite Producers**

The value of information gathered for a project is greatly influenced by how well a sample represents the total population. A sample that is not a true representation of the total population may not project a true picture. Taking this into account, the Stratified Random Sampling procedure was selected for the research of strategic consideration within the vermiculite industry. The characteristics of the sample, has compelled the selection of the sampling procedure. The selection was made due to the fact that the total population could be divided into distinct exclusive groups. Stratified sampling allows for the proportional allocation of sample size to each identified group; since this is possible without a detailed population frame. The total vermiculite consumption may not be determined due to geographical displacement from the major vermiculite consuming markets. Thus, the samples have been divided into distinct exclusive market segments of the vermiculite industry, according to the following criteria, as indicated by table 4.2. From this information PV management will be able to identify which markets they can target or which markets they can abolish.

**Table 4.2: Sample characteristic of the vermiculite industry**

<b>Distinctive groups</b>	<b>Characteristic</b>
Vermiculite ore deposits	Countries having reported ore deposits (Population) Countries producing vermiculite (Sample) Countries producing more than 10 000 tonnes per annum (Exclusive group)
Vermiculite Market	Countries consuming vermiculite (Population) PV market segment (Sample) End applications (Exclusive groups) Construction Agricultural & Horticultural Refractory Friction lining

## **4.6 Data analysis approach**

There are three popular data analysis approaches namely:

1. Classical
2. Exploratory (EDA)
3. Bayesian

The Explanatory Data Analysis (EDA) approach will be used to analyse the data collected, as it was based on a philosophy that employs a variety of techniques, mostly of a graphical nature, including scatter plots, histograms, probability plots and mean plots. The Exploratory Data Analysis approach does not impose deterministic or probabilistic models on the data. On the contrary, the EDA approach allows the data to suggest admissible models that best fit the data (NIST/SEMATECH. 2006: 1.1.2). The main focus of the EDA approach is on the data, its structure, outliers, and models suggested by the data. Most EDA techniques are graphical in nature with a few quantitative techniques. The reason for the heavy reliance on graphics is that, by its very nature, the main role of EDA is to open-mindedly explore. The graphics give the analyst unparalleled power to do so, enticing the data to reveal its structural secrets and always ready to gain some new, often unsuspected, insight into the data.



### **The Mean Plot Technique**

This technique was chosen as it can be used with ungrouped data to determine if the mean is changing over time. Although the mean is the most commonly used measure of location, the same concept applies to other measures of location. For example, instead of plotting the mean of each group, the median or the trimmed mean might be plotted instead. This can be done if there are significant outliers in the data and a more robust measure of location than the mean is desired.

## **4.7 Limitations of the research project**

Limitations within the research have led to the adopting of the qualitative approach, due to inaccessibility of international market participants, especially competitors and their customers.

## **4.8 Summary**

Collecting primary data from PV management, local and international customers will assist the author to identify underlying factors why customers prefer specific vermiculite grades. The data will also assist in identifying whether customers are willing to assist PV in product development and product innovation. Selecting the scope of the secondary sample for the research has posed as an initial hindrance, but the stratified sample procedures have assisted in dividing the sample into distinct exclusive market segments. This has proved to be successful, ranging from ore deposits to consumer market segments.

Data gathered during the research will be discussed in chapter five with graphically representation of primary and secondary data.

## **CHAPTER 5**

### **5. Results**

#### **5.1 Introduction**

The content of this chapter is dedicated to the representation of findings gathered on the study subject, pertaining to customer's preference to coarser grades, potential alternative uses for finer grades and marketing finer grades to current users of coarser grades. Data gathered was sorted, organised and structured to become information. Primary data was gathered through focus group discussions and questionnaires, whereas secondary data was gathered through internal reports, external reports and publications.

Focus group discussions were concentrated around the international markets and how the subsidiary managers view their customers. Discussions concerning finer grade market growth also took place. The customer's questionnaires focused on what grades of vermiculite they are using, what product qualities are important to their process, reasons for using specific vermiculite grades, product research and development, expansion of customer product application and product range.

Secondary data market results are divided into four sections, representing the four main market segments in which PV competes namely; Europe, America, Asia and local. Since each market has shown distinctive differences, thus the need to address it as such.

Results pertaining to international markets focused on different country's mining capacities and their competitive advantages. Each country has a fixed ore reserve base, which directly effects the competition within the PV international market. It is, however, important to point out that secondary data pertaining to PV, is exclusively sourced from individuals that attended the company's annual strategic meeting held in 30 March 2010 or internal records and reports, unless otherwise referred to. All other secondary data was sourced from external reports and publications.

## **5.2 Primary results**

### **5.2.1. Why the customers prefer coarser grades**

#### **Focus Group discussions**

The focus during these discussions was on the three objectives of this research project. The responses are summarised within this sub-section of the chapter, reflecting on the views and perceptions of the three major market regions namely America, Asia and Europe.

Respondents have shown mixed views with regards to why customers prefer coarser grades. The Asian representative's response was that it is important to understand the technology developed for each end-product application where specific grade of vermiculite provides the desired results. Key driver is product technology development using a specific grade best-fit in achieving product performance.

The response from the American representatives was that their customer's customers require a specific grade e.g. in the horticultural market where growers want to see a certain size of vermiculite in their mix even if it does not specifically have to be that size in order to work. Another example raised by the respondent was that in certain refractory applications, using a finer size of vermiculite does not work as well due to the additional components that are needed in order to pump long distances which results in higher costs.

Europe's representative response was that it is all to with historical formulations. Customers have been using these formulations for years and rely on the old adage "if it works do not change it" It was also mentioned that Europe is a very mature market and the companies dealing with Palabora Europe Limited have been buying the same grade and the same amount (roughly) for years and years.

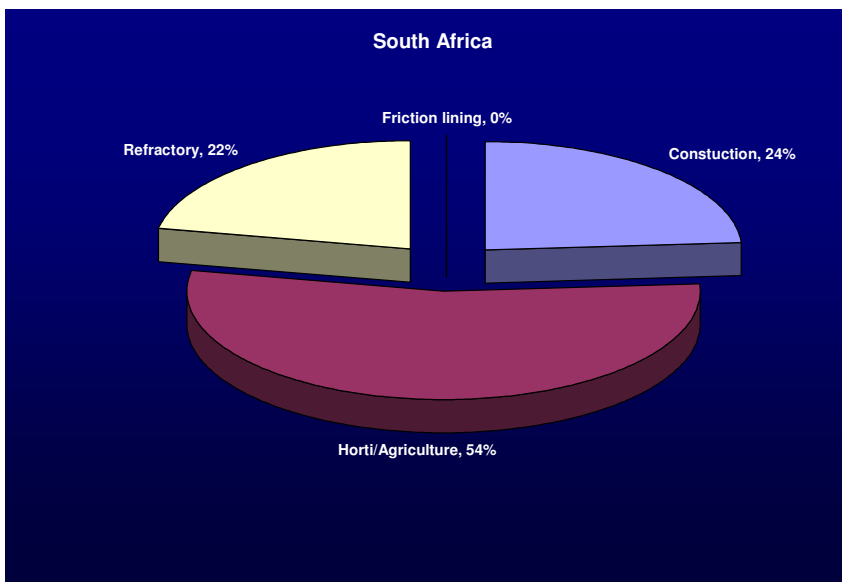
These mixed views and perception can be contributed to personal connections in the respective market segments. All respondents agree that in general the type of vermiculite grades used is dependant on the end-product application.

## Questionnaires South African Customers

A total of twelve responses were received back from sixteen that were included in the study population sample. A full overview of the responses can be viewed in appendix 6.

One of the objectives in the questionnaire was to establish why customers prefer using coarser grades in their processes and applications. Four questions were asked to determine this. A question was asked to determine what grade of vermiculite individual customers are currently using. From the analysis it was determined that all twelve respondents are using coarser grades and 42% of them are also using finer grades.

Customers were also asked in what end application they are competing in and the result of the analysis is illustrated in figure 5.1.



**Figure 5.1: Percentage end applications types use in South Africa**

*Adapted from: Palabora Vermiculite data base (2010)*

It's clearly evident from the analysis that horti/agricultural is the dominant end application and that refractory and construction making up the rest. Horti/agricultural and refractory applications are predominantly using coarser grades (large, medium and fine) while construction and friction lining applications are mainly using finer grades (superfine and micron). Furthermore it is clear that the South African market lacks consumption representation within technologically advanced applications, where finer grades are generally more suitable.

One of the questions asked intended to determine how important certain product qualities are for the customer's process. All the respondents indicated that screen sizing is either very important or important to them. None of them indicated that they are flexible when it comes to the specific grades used in their process. The only product quality that is of less importance for some customers is moisture content.

A more direct question was asked why customers prefer using a specific grade. 50% responded (all in the horti/agricultural applications) that it is a requirement from their customers. They claim that their customers buy their product on the visual appearance of the product, the coarser the product the better the product. The other 50% indicated that it is the best fit product for their particular end application.

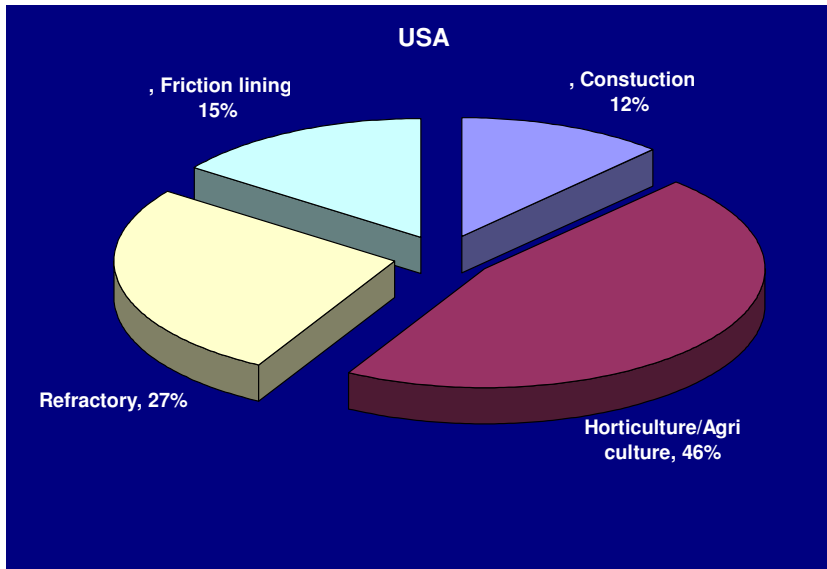
### **Questionnaires International Customers**

The subsidiary managers in Europe, America and Asia requested that the questionnaire be sent to them in order for them to forward it to the selected sample population within each of their geographical areas. The questionnaires were returned to the subsidiary managers and the feedback from their customers was summarised. A full overview of the responses can be viewed in appendix 7.

The international customers were asked the same questions as the South Africa customers to determine why customers prefer using coarser grades in their processes and applications. Looking at PV vermiculite grades used by customers in the different geographical, one can observe a distinct difference between them. From the analysis conducted it is evident that 90% of American customers use coarser grades and only 10% of them are using finer grades. In Asia 75% of customers are using all five grades and 25% indicated that they only use coarser grades in their applications and processes. In Europe the representation is different compared to Asia and America. 33% of the customers use only finer grades and 17% only using coarser grades. The remaining 50% indicated that they use all the grades.

Looking at the end applications customers competing in America is similar to South Africa with the exception of the friction lining market. Figure 5.2 illustrates the percentage end application types use in America. Horti/agricultural and refractory represents 73% of the customers end applications which confirm the reason why 90% of customers using coarser grades. A friction lining and construction application uses finer grades and seeing that American customers purchase very little finer

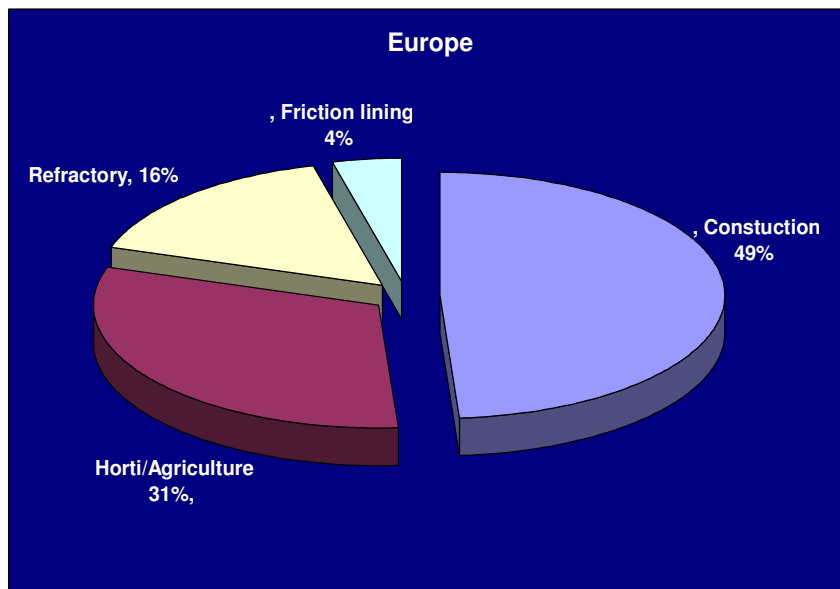
grades from PV, one can assume that they purchase these grades for other vermiculite suppliers. An opportunity might exit in these markets.



**Figure 5.2: Percentage end applications types use in America**

*Adapted from: Palabora Vermiculite data base (2010)*

In Europe construction and friction lining make up 53% of end applications while horti/agricultural and refractory make up 47% of end applications. Figure 5.3 illustrates the percentage end application types used in Europe.

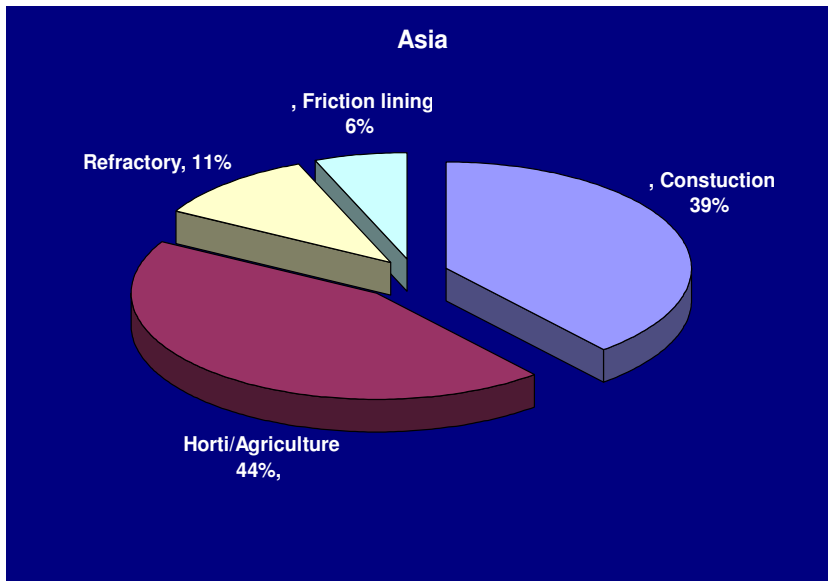


**Figure 5.3: Percentage end applications types use in Europe**

*Adapted from: Palabora Vermiculite data base (2010)*

Europe is PV's biggest vermiculite customer as indicated in figure 1.4 in chapter 1 and with construction and refractory applications contributing to 53% of total European vermiculite use, makes Europe also the biggest user of finer grades (superfine and micron) as indicated in figure 5.3.

Looking at Asia's end applications it is obvious that the Asian market follows the European market in technologically advanced applications, where finer grades are generally more suitable. 45% of the applications used are in construction and friction lining. Horti/Agricultural applications are still the biggest users of coarser grades in Asia to ensure food supply to the population. Figure 5.4 illustrates the percentage end application types use in Asia.



**Figure 5.4: Percentage end applications types use in Asia**

*Adapted from: Palabora Vermiculite data base (2010)*

Looking at the response concerning product quality importance, it is evident that there is a distinct lack of flexibility on the part of the customers. The comparison between local and international customers is consistent looking at screen sizing, non-exfoliating content, yield and moisture analysis. All customers regarded these product qualities as very important or important.

The responses from the international customers concerning the reasons why they use a specific vermiculite grade differ in Europe as opposed to other regions. Most European customers indicated that due to historical formulation, the grade used is

best fit for the application and that the end application almost dictates the type of vermiculite used.

### **5.2.2. Potential alternative uses for finer grades**

#### **Focus Group discussions**

The respondents feel that the vermiculite mines and associations should be facilitating R&D. The European representative comment that customers will not assist PV with R&D unless they could secure some kind of saving whether it be price or more product of the coarser grades. The other region's responses were different, indicating that customers doing any type of R&D work would be delighted if PV assists.

Respondents are adamant that R&D, in perusal of new end-applications, will ensure alternative uses for finer grades vermiculite. In addition, they have also indicated that R&D should not be limited to customers alone, as the case has been for the past fifteen years, but suppliers (PV) should assertively pursue R&D.

#### **Questionnaires South African Customers**

From the analysis it is evident that 50% of local customers are doing some R&D with vermiculite. 75% of the customers doing R&D are in the construction and refractory industry, which might create opportunities in the development of finer grade applications. The remaining customers doing R&D are in the horti/agricultural industry. All these customers indicated that they will welcome PV's assistance in R&D. More research is necessary to determine in which specific grades these customers are doing research.

50% of the respondents indicated that they have received enquiries concerning using vermiculite as a substitute product for asbestos. A second observation regarding the positive acknowledgement of this opportunity, was that all the customers were from the high tech product market segment. It is quite clear from the analysis that the new asbestos legislation does not possess an opportunity for the horti/agricultural industry, but rather the products entailing a higher level of research and engineering, such as the lightweight board, fire proofing and construction industry.



### **Questionnaires International Customers**

In Asia 60% of the respondents indicated that they are doing R&D and some of the customers are owners of product technology. In America only 17% are doing R&D. All these customers indicated that they will welcome PV's assistance in R&D. It was a surprise to discover that there is no R&D currently taking place in Europe and that customers are only looking at existing application improvements. European customers indicated that they are not willing to assist PV in doing R&D, but want PV to pay to help them improve their own end use applications but are obviously not willing to share this enhancement with others. It is concerning to discover that a first world region like Europe which competes in technologically advanced application market does not do R&D.

### **5.2.3. How can the finer grades be marketed to current users of coarser grades**

#### **Focus Group discussions**

During the focus group discussion it was noticed that respondents were not totally at ease when questions were asked regarding the use of finer grades vermiculite in existing coarser grade applications. One of the responses was that, given the amount of time and investment spent from development phase to qualification and certification of end-product, any attempt to change the original recipe would warrant significant re-work and investments i.e. going through the whole process again.

All respondents are in agreement that it will be difficult to market finer grades vermiculite to customers that are only using coarser grades vermiculite. Price is also becoming a problem when it comes to the finer grades due to cheaper prices competitors are offering.

### **Questionnaires South African Customers**

Questions were presented to customers to ascertain how one can market finer grades to existing coarser grade customers. Predominately the South African customers using coarser grades are satisfied with product availability and quality. This is mainly due to the fact that local customers are close to the supplier and receive priority over international markets. From the analysis it is evident that customer using coarser grades are not comfortable in using finer grades in their existing applications.

Looking at the barriers restricting customers from expanding their business, 25% of the respondents indicate that their business risk is too great, 34% claim that there is not sufficient demand to grow their business, 41% indicates that the cost of vermiculite is a constraint to grow their business. The customers claiming there is not sufficient demand are all in the horti/agricultural industry and those indicated that the cost of vermiculite is a limiting factor, are in the construction and refractory industry.

### **Questionnaires International Customers**

Analysing the feedback from the three regions it become evident that there is a distinct difference in the way international customers feel about the PV's product availability compared to PV's local customers. Asian customer's response was neutral while American and European customer's responses were dissatisfied and very dissatisfied respectively. To determine why these customers are unhappy, a sample group was selected and were asked to elaborate on why the dissatisfaction. The responses received back indicated the dissatisfaction is mainly because PV introduced a product allocation program to customers using coarser grades in America and Europe.

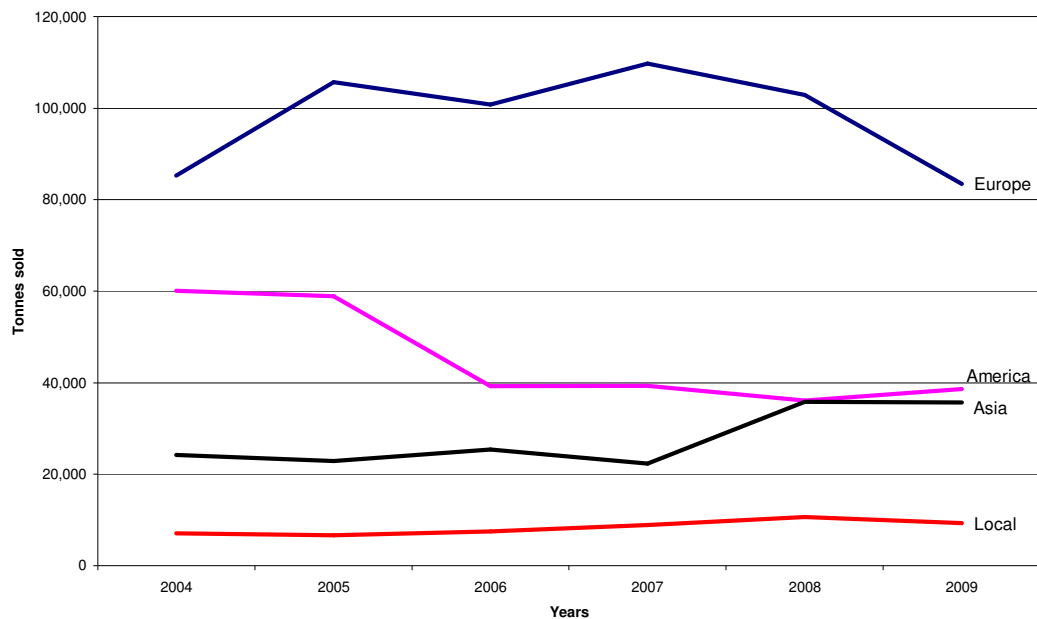
From this analysis it is evident that customers using coarser grades vermiculite, end users are very niche applications and unless one can use another (competitors) vermiculite or substitute away from vermiculite, will remain until vermiculite is not a viable ingredient.

From the analysis it was found that the price gap between PV's and competitor's product restrict customers from growing their business. The lack of technology development, limited number of applications and availability of coarser grades are some of the other constrains customers reported on.

## 5.3 Secondary results

### 5.3.1. Annual sales history of PV

As previously mentioned in the introduction of chapter 5 the secondary data market results are divided into four sections namely; Europe, America, Asia and local. To determine how PV markets are performing data on sales tonnes from 2004 to 2009 were gathered and analysed. Figure 5.5 illustrates the total tonnes sold per geographical area from 2004 to 2009.

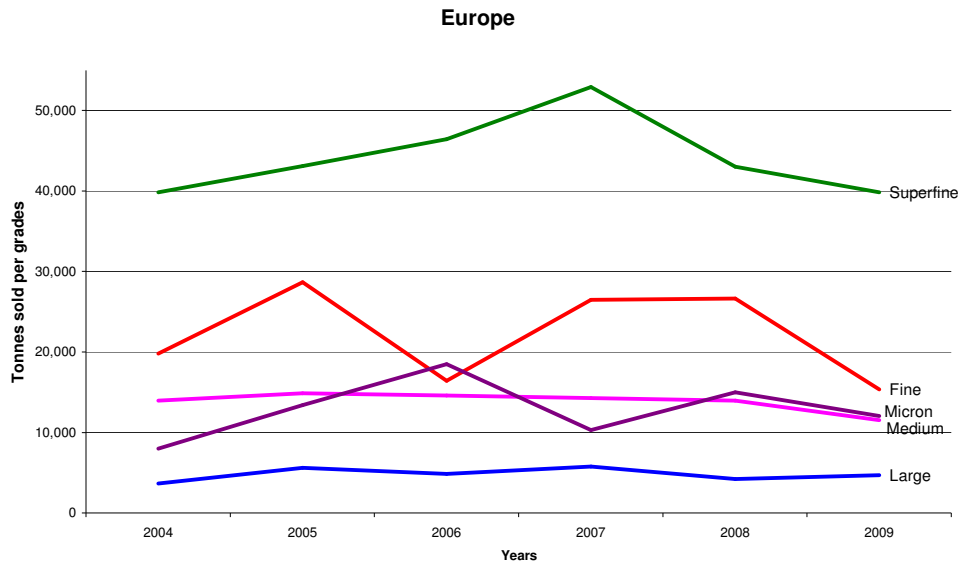


**Figure 5.5: Total tonnes sold per geographical area from 2004 to 2009**

*Adapted from: Palabora Vermiculite data base (2010)*

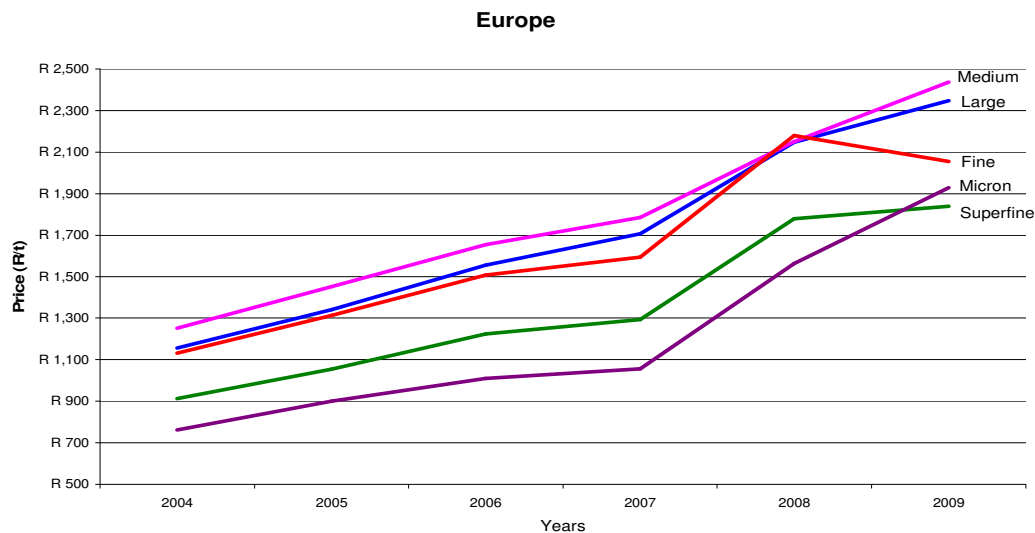
Europe accounts for 50% of Palabora's total annual sales volume and any changes or trends noted within this segment will have a more profound effect on the company's profit margin than any other segment. Figure 5.5 clearly indicates that the European market is in a decline since the end of 2007. Tonnes sold in 2009 were lower than the tonnes sold in 2004. The American market had a significant decline in tonnes sold for the period 2005/2006. The Asian markets were relatively constant up to the beginning of 2007 and grew almost 70% from 2007 to 2009. Local markets indicate gradual growth since 2005. A more in-depth analysis was conducted on each geographical area to determine the reasons for the decline and/or growth in the different areas.

Figure 5.6 illustrates the tonnes sold per grade in Europe from 2004 to 2009. From the analysis the decline in European sales were mainly in superfine and fine grade. Medium and micron had a marginal contribution to the sales decline. Large sales remain relatively constant through this period. Further analysis has revealed that the decline in sales were price related. Figure 5.7 illustrates the price increase per grade for Europe from 2004 to 2009.



**Figure 5.6 Tonnes sold per grade in Europe from 2004 to 2009**

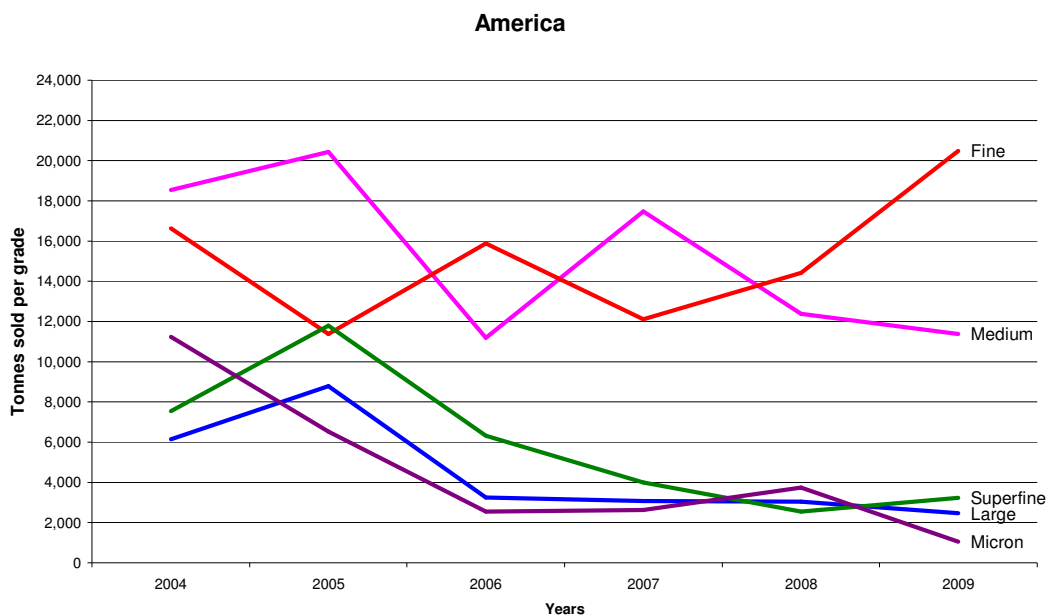
*Adapted from: Palabora Vermiculite data base (2010)*



**Figure 5.7: Price increase per grade for Europe from 2004 to 2009**

*Adapted from: Palabora Vermiculite data base (2010)*

Figure 5.8 illustrates the tonnes sold per grade in America. From analysis it is evident that in 2005 the sales of all grades with the exception of fine grade declined. Further analysis revealed that the decline of large grade was mainly due to depletion of coarser grades in the ore body as described in chapter 1. With the decline of coarser grades in the ore body, a management decision was made to reduce the sales volumes of some of the coarser grades in America to ensure supply to Europe and Asia where the profit margins were higher. The decline in superfine and micron grades occurred due to local American vermiculite mines ability to supply these grades in the American market. The increase in fine grade from 2007 is mainly due because of the ability for PV to supply fine grade to supplement large and medium grades.

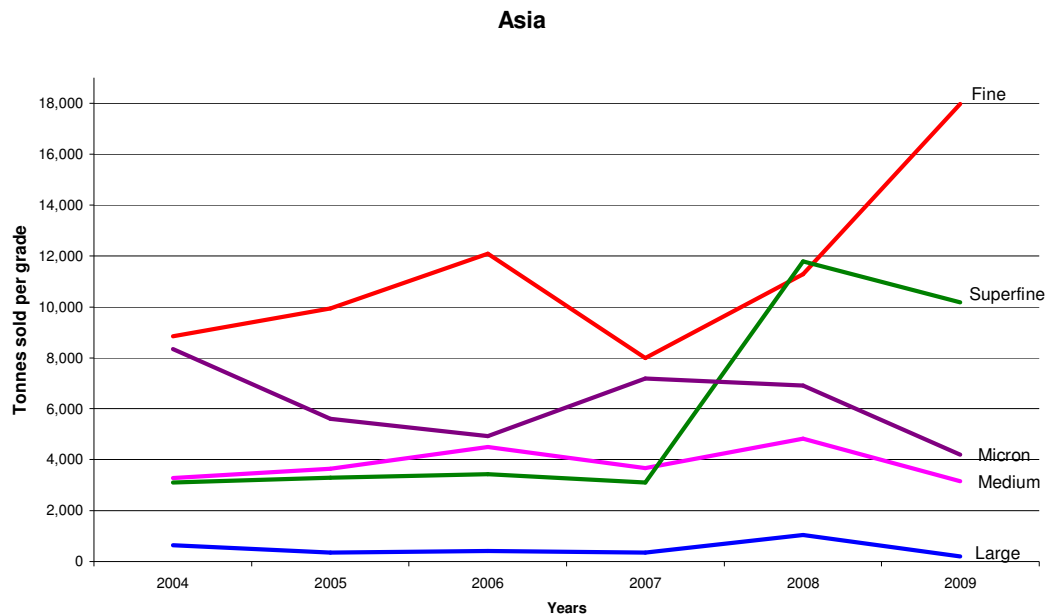


**Figure 5.8 Tonnes sold per grade in America from 2004 to 2009**

*Adapted from: Palabora Vermiculite data base (2010)*

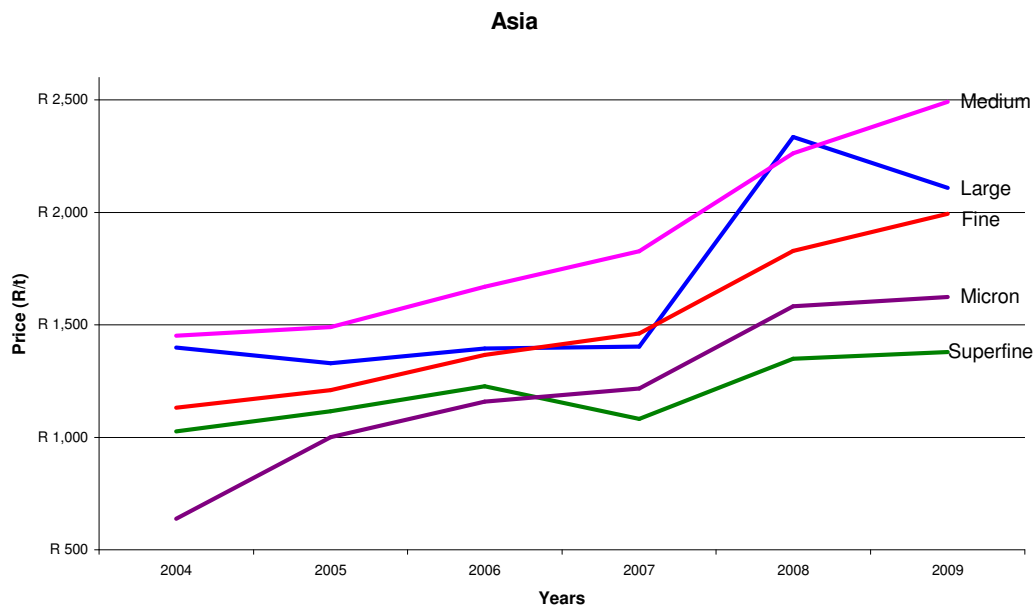
Figure 5.9 illustrates the tonnes sold per grade to the Asian market. From the analysis it is clear that this is a stable market that has grown since 2007. The step change of superfine was the result of a new market identified in Asia. What is interesting is that this new market of superfine is in the agricultural sector. This is contrary to the normal practice globally where coarser grades are traditionally used. Decline in the large and medium grades are due to product availability as mentioned previously. The reason for the decline in micron grade was due to price increases

from PV and the availability of cheaper product from competitors. Figure 5.10 illustrates the price increase per grade for Asia from 2004 to 2009.



**Figure 5.9 Tonnes sold per grade in Asia from 2004 to 2009**

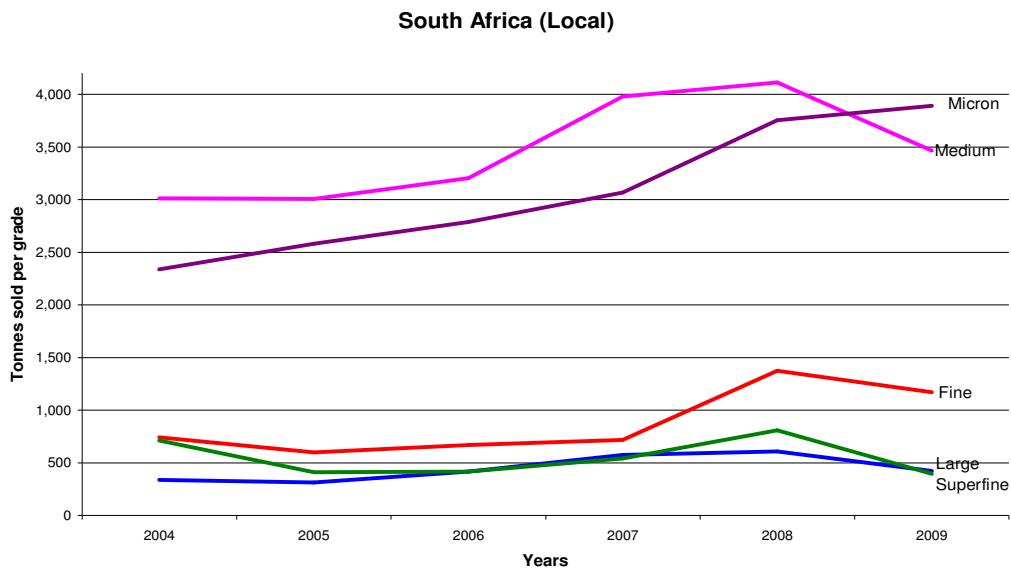
*Adapted from: Palabora Vermiculite data base (2010)*



**Figure 5.10: Price increase per grade for Asia from 2004 to 2009**

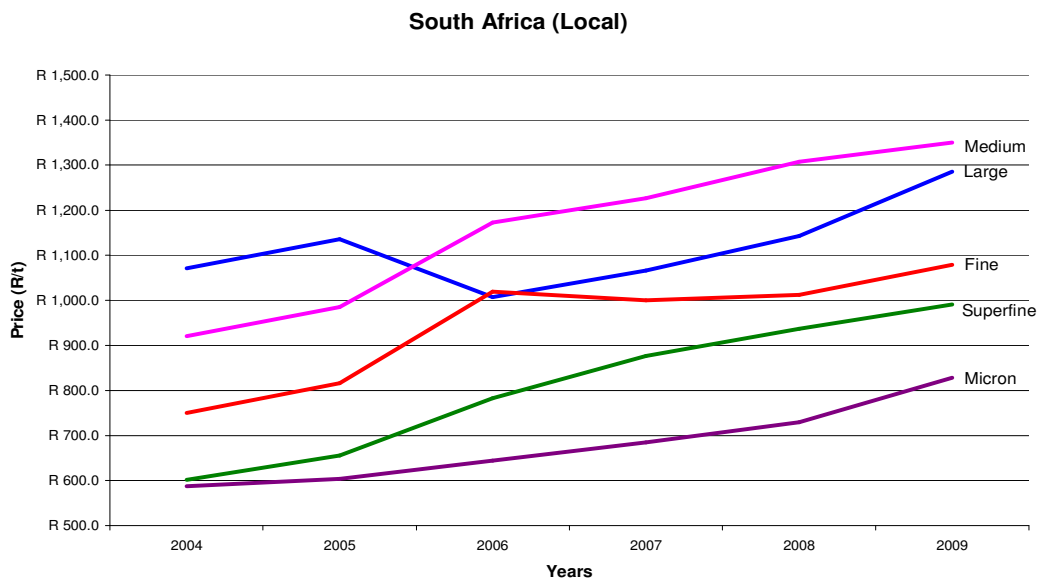
*Adapted from: Palabora Vermiculite data base (2010)*

Figure 5.11 illustrates the tonnes sold per grade to the South Africa (local) market from 2004 to 2009. The analysis of the local market shows that it is a stable and predictable market. The major growth in this market was brought on by micron and fine grades. The growth in micron was due to a new player in the construction industry utilising new technology. The decline in coarser grades (large and medium) was a consequence of price increase through the years. Figure 5.12 illustrates the price increase per grade for Asia from 2004 to 2009.



**Figure 5.11 Tonnes sold per grade in South Africa from 2004 to 2009**

*Adapted from: Palabora Vermiculite data base (2010)*



**Figure 5.12: Price increase per grade for South Africa from 2004 to 2009**

*Adapted from: Palabora Vermiculite data base (2010)*

### 5.3.2. International market information on competitors mining capabilities and competitive advantages

In this section, production of vermiculite is defined as the reported or estimated output of vermiculite concentrate produced from the mining of vermiculite ore. Table 5.1 lists the vermiculite producers with an annual production of more than 10 000 tonnes in 2009. These countries make-up the total scope of secondary population sample considered for the study.

**Table 5.1: Global vermiculite producers**

*Adapted from: U.S Geological Survey (2010)*

Country	2009
Zimbabwe <sup>1</sup>	11 000 tonnes
Egypt <sup>1</sup>	12 000 tonnes
Brazil	14 000 tonnes
Australia <sup>1</sup>	15 000 tonnes
Russia <sup>1</sup>	25 000 tonnes
China <sup>1</sup>	130 000 tonnes
United States of America <sup>1</sup>	110 000 tonnes
South Africa	194 100 tonnes

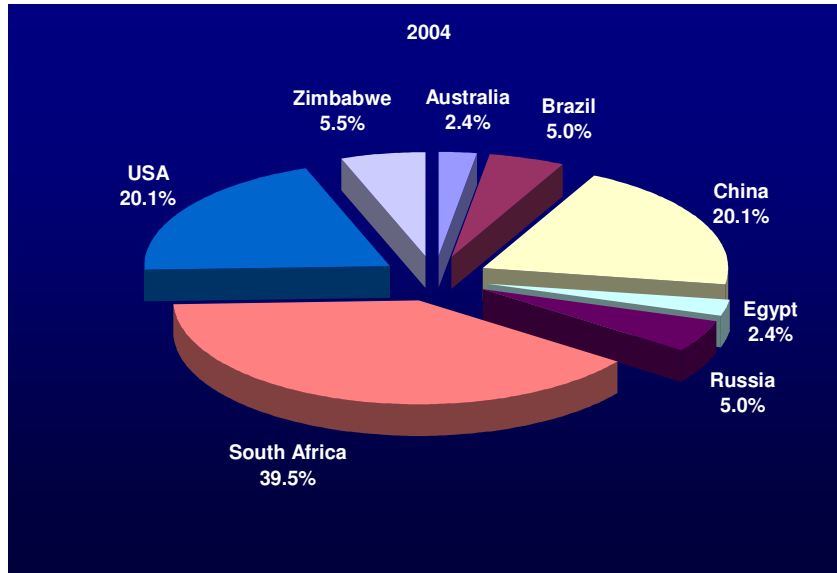
<sup>1</sup> Estimated

It is quite clear from table 5.1 that USA, China and South Africa account for more than 80% of the world production, but by no means should the smaller producers be disregarded as bystanders. The three major vermiculite producer's ore reserves and production capabilities will be discussed with specific detail to USA and China since these two make up the key competitors of PV.

Data was collected and analysed to determine the global vermiculite production per country. The data that was collected was from the countries stipulated in table 5.1 as these are the countries that can compete against PV.

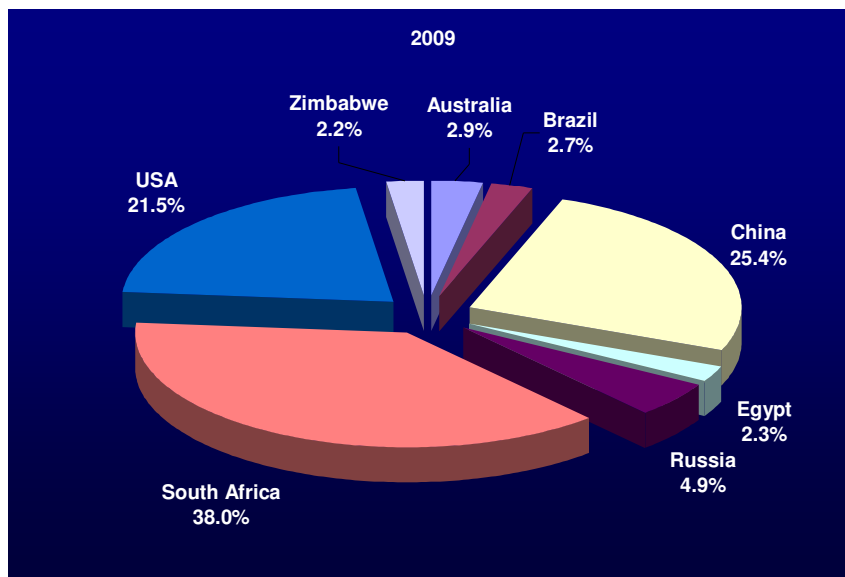


Figure 5.13 and figure 5.14 illustrate the global vermiculite production per country for 2004 and 2009 respectively. Figure 5.15 illustrates tonnes produces by South Africa, America, China and Zimbabwe. Zimbabwe is the only Southern Africa country that competes against PV in the international markets.



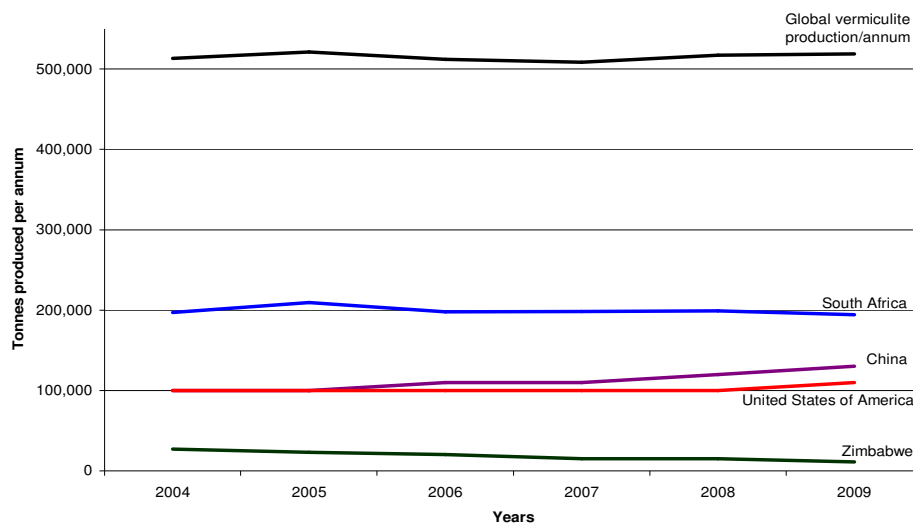
**Figure 5.13: Global vermiculite production 2004**

*Adapted from: U.S Geological Survey (2010)*



**Figure 5.14: Global vermiculite production 2009**

*Adapted from: U.S Geological Survey (2010)*



**Figure 5.15: Annual production by SA, USA, China and Zimbabwe 2004 to 2009**

*Adapted from: U.S Geological Survey (2010)*

It is clear from figure 5.15 that the annual vermiculite production globally is increasing marginally. The Chinese and American vermiculite producer's production increased while both the Southern Africa producer's production is decreasing.

### **South Africa**

According to Roskill's Report, (2003: 50) South African ore reserves of vermiculite are estimated to be 80Mt with 73Mt being located at Phalaborwa and the remainder also located in the Limpopo Province near Naboomspruit and Louis Trichart. Both mines have not actively been mined for the past ten years. The PV operations commenced in 1964 and are capable of producing all five marketable grades, large, medium, fine, superfine and micron. PV production for 2009 was 194 100 tonnes of which 94% was exported and the remaining tonnes sold locally. Since 2006 PV experience a decline in coarser grades in its ore body which resulted in a decrease in coarser grades production and an increase in finer grades production as described in chapter 1. From the figure 5.13 and 5.14 it is evident that PV (South Africa) has lost global market share.

### **China**

Vermiculite deposits in China are to be found in Shanxi, Inner Mongolia, Hennan, Hubei Xinjiang and Hebei. Xinjiang and Hebei represents the most competitive threat to PV.

Xinjiang Yuli Xinlong Vermiculite Co Ltd, the largest vermiculite supplier in China has three entities consisting of one vermiculite mine in Qieganbulake of Xinjiang Yuli County, one vermiculite processing plant and a vermiculite compound fertilizer plant. This vermiculite deposit is 14.8 million tonnes and an estimated reserve of 100 million tonnes is the largest in China. The company can supply all five marketable grades and has an annual estimated production capacity of 130 000 tonnes vermiculite concentrate. The quality of Xinjiang vermiculite ranks No.1 in China. The designed mining capacity is about 220 000 tonnes with a process design capacity of 170 000 tonnes per annum. From figure 5.12 and 5.13 it is apparent that China is an emerging major player in the global vermiculite market.

### **United States of America**

Almost half of the world's vermiculite reserves are located in the USA estimated at 25 million tonnes. Over 95% of the United States vermiculite reserve base is found in Montana, South Carolina and Virginia. Minor reserves are reported in Texas, Kansas, Colorado, Alabama and California. Production commenced in the 1920's and rose to a peak of 331 00 tonnes in 1973. During the early and mid 1980's, production remained fairly level, fluctuating annually between 280 000 and 290 000 tonnes. Since then production has declined and it was reported by the US Geological Survey to have been 110 000 tonnes for 2009. From figures 5.12 and 5.13 it is evident that the production output of America increased by 1.4%, indication that their market is growing.

W.R. Grace & Co. is a major vermiculite producer and the company operates several mines around Enoree, South Carolina and is the largest American producer of vermiculite concentrate. The company also operates vermiculite plants in the USA at locations such as Phoenix, Arizona, Pompano Beach, Florida and South Carolina. The Enoree beneficiation plant operates a wet process for the production of vermiculite concentrate. The annual capacity of the Enoree operations is believed to be in order of 100 000 tonnes, mostly of finer grades of vermiculite. W.R. Grace & Co also operates several exfoliation plants and distributes the final exfoliated product to the end application producers.

Virginia Vermiculite Ltd. operates vermiculite mines and wet process beneficiation plants in Louisa County, Virginia and Woodruff, South Carolina. The annual

combined capacity of the two operations is believed to approach 100 000 tonnes. In general, these mines produce finer grades of vermiculite. The majority of the US beneficiation plants operate on a wet process that is common to mines processing finer grade of vermiculite. There is no evidence available that suggests that any ore deposit in America contains larger vermiculite grades.

## 5.4 Summary

Primary data collected, indicates that management needs to recognise the unhappiness of their major regions customers due to product availability and delivery time. PV is faced with a decline phase in Europe hence the slowdown of sales in historical application market segments as well as the decline in the ore body's coarser fraction size.

From the analysis of the data collected, the following observations can be made:

- There is a consistent perception that the specific grade been used is critical to an application. There is a general consensus under the coarser grades customers that their clients require coarser material in the end product.
- Only 27% of PV's customer base is currently doing R&D. This is mainly in the refractory and construction industries. Europe, which is PV's largest customer base, is not doing any R&D only improvements on existing applications. 75% of customers indicated that they are willing to collaborate with PV on R&D as well as sharing information freely. It is also evident that there is a lack of R&D in the coarser grade applications.
- Customer indicated that they are not flexible on product qualities i.e. screen sizing and yield. This indicates that to market finer grades in the coarser grade markets will require R&D and marketing on the part of PV.
- Data collected of the international vermiculite mining capacities indicated that South Africa and China are able to produce all five marketable grades, while America is only able to produce finer grades.

The following chapter reflect on the relation of the results to the research objectives, literature review as well as link findings summarised above to the appropriateness of theoretical and conceptual framework.

## **CHAPTER 6**

### **6. Discussion of Results**

This chapter is dedicated to the discussion of the results related to the research objectives, which will be linked to literature review and theoretical framework.

#### **6.1 Why customers prefer coarser grades**

From the results in chapter 5, it was discovered that customers using coarser grades for specific applications are doing it because of historical formulations, perception that it is the best product for the application and that their customers prefer coarser grades. According to Simonson (2005) the studies done on preference construction, has agreed that customers' preferences develop with growth in their familiarity with or experience of a specific product. He also claims that people's preferences are likely to be stable over time, and people are likely to be well aware of their preferences.

Looking at what PV's customers have to say about their customer's preferences, one can link it back to what was discussed in the literature review chapter where according to Kwon et al (2009: 263) a traditional perspective to studying customers decisions, mostly attributed to economists, makes the common assumptions that "each individual has stable and coherent preferences" and that "people know their preferences" This relates back to findings that customers know what they like and are able to make choices among options based on these underlying well-defined, pre-existing preferences.

#### **6.2 Potential alternative uses for finer grades**

To develop alternative uses for finer grades in the current markets PV serves, will be a substantial challenge. Only 27% of PV's customer base is currently doing some R&D. From the analysis it is evident that most of the customers in the four regions are willing to except assistance or are willing to assist PV in R&D. Alam (2006), describe customer involvement as product/service providers and current/potential customers jointly engage in innovation projects, and exchange ideas to anticipate customer's demands and develop new product/services.

From 2004 to 2006 superfine sales in Europe increased by 25.6% while for the period 2006 to 2009 it decreased by 25.3% as indicated in figure 5.6. Sales for micron also decrease by 35% for the period 2006 to 2009. This indicates a negative market growth in Europe for finer grades. Figure 5.7 illustrates the price increases per grade for Europe which resulted in an average of 51% increase for all grades for the period 2004 to 2009. Europe lost customers due these price increases. This linked to Muthitacharoen *et al*, (2006: 679) multi-attribute modelling approach, the Attribute-Based Preference and Attitude-Based Preference. One of the four attributes identified is transaction cost preference which relate to the ability to provide its customers with favourable product price and other financial transaction costs (i.e. shipping cost, sales taxes, etc.) occurring during the purchasing process. PV lost its market share in the finer grades most likely due to this.

In view of R&D done by Asian customers, Ansoff's matrix framework was considered using product development to develop new products in existing markets. This relates to the use of superfine in the agricultural industry.

### **6.3 How the finer grades can be marketed to current coarser grade users**

The results from the field study indicated that none of the customers are flexible in product qualities currently used. It will be very difficult for PV to market finer grades to customers using coarser grades if the customers are not flexible. Due to the depletion of coarser grades in the ore body customers at some stage will have to convert to finer grades or face losing their business. When this happens customers will have to do a SWOT analysis to determine their threats and opportunities if they want to stay competitive.

International regions finer grades sales have decline which can be linked to Porter's five competitive forces. From these results it appears that customers have buyer power in the case of finer grades where customers have more choice due to multiple suppliers feeding the market as indicated by the secondary data analysis. China's vermiculite production is growing annually and is becoming a bigger rivalry, threatening PV's global market share. The finer grades price gap between PV and its competitors are also contribution to this.

## **CHAPTER 7**

### **7. Conclusions and Recommendations**

This chapter is dedicated to summarise what can be concluded from the results of the research study, specific to the research statement. From the conclusions recommendations will be made to change or solve the problem PV is currently facing concerning finer grades vermiculite.

While the ore body is declining in coarser grades, PV is facing more than one challenge. Coarser grades production is declining while finer grades production increased and stockpiled onsite. The research study revealed that PV is also losing finer grade sales in all four regions they compete in. The decline in the coarser grade sales are due to the product availability. Europe superfine and micron sales have decrease by 25.3% and 35% respectively. With an average product price increasing of up to 50% in this region, surely this had an influence on the sales of these specific grades.

Superfine and micron sales in America follow a similar pattern and it was revealed that no PV micron will be sold in America in 2010. The vermiculite quality of the American local vermiculite supplier's is not as good as PV's quality, but quality is not everything. If the price of a product is becoming too expensive customers as indicate in the study purchase second best. In light of today's competitive pressures and a rapidly changing environment, to not doing something different is to give way to one's competitors.

The remaining regions (local and Asia) are both growing markets and the opportunity for growth is vast. Less than a third of vermiculite used locally full's within the finer grade fractions. There is a lack of using high technological end application in South Africa comparing with Europe and Asia. Customers using superfine in horti/agricultural application in Asia opens up new markets for finer grades.

The limitation of this study was the gathering of data and the inaccessibility of international market participants, especially competitors and their customers.

To answer the research question as stated in chapter one, will strategic marketing options grow the sales of finer grade vermiculite, the answer is yes.

## **Recommendations**

For PV to increase its finer grades sales they need to adopt a new or change their existing marketing strategy. PV's strategy needs to take in account the competitive and rapid changing environment we are living in today. PV management needs to consider the following:

- Finer grade supply excess demand and currently PV stockpile the excess finer grades while their finer grades sales globally are declining. To increase finer grade sales PV needs to adopt a price strategy approach. Different price strategies can be adopted for different situations i.e.:
  - Penetration pricing - The price charged for products is set artificially low in order to gain market share. Once this is achieved, the price is increased. (local and Asia markets)
  - Value pricing - This approach is used where external factors such as recession or increased competition force companies to provide 'value' products to retain sales. (Europe and American markets)
- To develop alternative uses for finer grades vermiculite PV needs to engage in R&D and need to look at the argument made by Flint (2002: 306), those managers who are well informed about the marketplace and in particular customers are more likely to envision realistic and meaningful new product ideas than those managers who are less market-oriented. Consistent market understanding best comes from formal processes designed to generate market intelligence and not from merely ad-hoc interactions with the marketplace.

## **Further research recommendations**

### **Local market**

Strategic marketing planning should focus on attaining the right product mix for each market segment PV competes in and always reach maximum profitability. New government legislation within South Africa can be isolated as an opportunity to increase sales, particularly in the board applications, possessing unique fire resistance attribute for the low cost housing project and upgrading of informal



squatter settlements. It is thus suggested that further research should be conducted in perusal of the opportunity draw from the broad product ranges produced by international customers.

### **Vermiculite producer's ore body constraints**

Each organisation has to recognise that they are constantly faced by the depletion of resources. Ore body constraints inherent to the mining industry play a major role in shaping the future and in particular for PV, maintaining their foothold as the market leader. Market leadership however, will no longer be possible in large and medium grades. The use of vermiculite in historical applications, such as the horticultural and refractory industry, will not be able to sustain business for PV any more, however particle size distribution in finer grades increased leading to increase production in these grades. The indication that demand has exceeded supply for the larger grades, for the past three to four years at PV, is an indication that other producers who may have had limited quantities of these grade, might also have reached their limits in coarser grades. It is therefore recommended that a specific research study be conducted to establish and accurately prove world vermiculite production life span of its resources in correlation to world demand for each specific particle size.

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**Web sites:**

<http://www.vermiculite.org/pdf/vhse.pdf> (TVA)

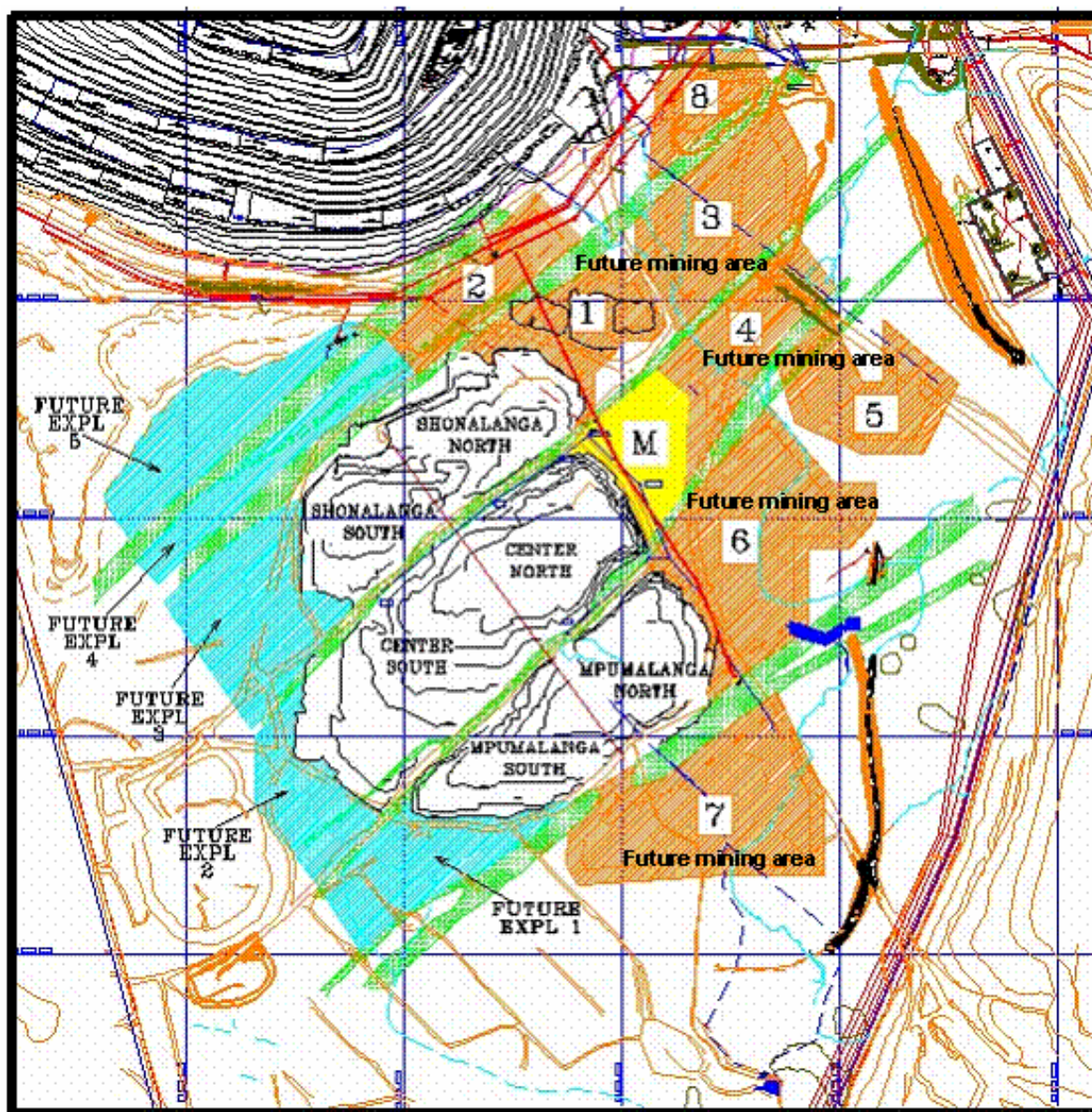
<http://tutor2u.net>

**Data Bases:**

Palabora Vermiculite: L:Drive

## 9. Appendices

### 9.1 Appendix 1: Palabora Vermiculite open pit mining area



Source from: PMC's archives

## 9.2 Appendix 2: Theoretical underpinnings of new product adoption in uncertain environments

Theoretical underpinnings of new product adoption in uncertain environment		
Theory / conceptual model	Theoretical insight	Outcomes
Innovation diffusion model (Rogers, 1983)	<ul style="list-style-type: none"> <li>• S-shaped new product diffusion and adoption rate</li> <li>• Categorizing customers on adoption rate</li> <li>• Communication to diffuse new product information</li> </ul>	<ul style="list-style-type: none"> <li>• Speed to market</li> <li>• Timing of product launch</li> <li>• Targeting customer initiators</li> </ul>
Market orientation (Kohli & Jaworski, 1990)	<ul style="list-style-type: none"> <li>• Customer orientation</li> <li>• Competition</li> <li>• Cross-functional integration</li> </ul>	<ul style="list-style-type: none"> <li>• Product meets customers needs</li> <li>• Create customer demand</li> <li>• Achieve customer satisfaction</li> <li>• Customer input and feedback</li> </ul>
Product orientation	<ul style="list-style-type: none"> <li>• Technical superiority</li> <li>• Product technology</li> <li>• Technical / product synergy</li> </ul>	<ul style="list-style-type: none"> <li>• Product technical sophistication</li> <li>• Technology-base competencies</li> </ul>
Organisation learning (Slater & Narver, 1995)	<ul style="list-style-type: none"> <li>• Continuous learning</li> <li>• Customer education</li> <li>• Extensive communication</li> <li>• Challenge existing technology</li> </ul>	<ul style="list-style-type: none"> <li>• Discontinuous innovations</li> <li>• Exploit competencies</li> <li>• Flexible systems</li> <li>• Product-user interface</li> </ul>

**Source from:** Eng and Quaia. 2009. *Strategies for improving new product adoption in uncertain environments: A selective review of the literature.* 276.

### 9.3 Appendix 3: South Africa customer's questionnaire.

#### South African Customers Questionnaire

Dear, Vermiculite Consumer

Company Name .....

#### Confidentiality

Your survey responses will be strictly confidential and data from this research will be reported only in the aggregate. Your information will be coded and will remain confidential. If you have questions at any time about the survey or the procedures, you may contact Ronald du Toit by email at the email address [ronald.dutoit@palabora.co.za](mailto:ronald.dutoit@palabora.co.za).

You are hereby invited to participate in Vermiculite market research survey. As part of my MBA studies your participation will enable Palabora Vermiculite (PV) to identify customer's product preference, why certain grades demand increase and others decrease and to determine alternative uses for finer grades vermiculite. Special attention regarding questions has been placed on the marketing of finer grade vermiculite.

#### Question 1

What type of Vermiculite grades is your company currently using?

☐ Large ☐ Medium ☐ Superfine ☐ Fine ☐ Micron

#### Question 2

For what type of applications does your company use vermiculite?

☐ Boards ☐ Construction ☐ Fire protection ☐ Insulation ☐ Agri-/Horticultural ☐ Refractory ☐ Friction lining

#### Question 3

What product qualities are the most important to your process?

a) *Screen Sizing*

☐ Unimportant ☐ Less important ☐ Important ☐ Very important ☐ Flexible

b) *Non exfoliating content*

☐ Unimportant ☐ Less important ☐ Important ☐ Very important ☐ Flexible

c) *Yield*

☐ Unimportant ☐ Less important ☐ Important ☐ Very important ☐ Flexible

d) *Moisture analysis*

☐ Unimportant ☐ Less important ☐ Important ☐ Very important ☐ Flexible



**Question 4**

How would you rate Palabora Mining's product availability?

☐ Very satisfied ☐ Satisfied ☐ Neutral ☐ Dissatisfied ☐ Very dissatisfied

**Question 5**

Is your company currently doing research and development (R&D) with regard to vermiculite?

(Product development / product innovation)

☐ Yes ☐ No

If Yes, would your company be interested in PV assisting your company with R&D

☐ Yes ☐ No

If No, would your company be interested in assisting PV with R&D

☐ Yes ☐ No

**Question 6**

Has your company considered expanding their applications / product range?

☐ Yes ☐ No

If Yes, please print the applications types. \_\_\_\_\_

**Question 7**

Has your company had any enquiries regarding the use of vermiculite as a substitute product for asbestos? (New Asbestos legislation introduced in 2004)

☐ Yes ☐ No

If YES, please state the application and number of enquiries. \_\_\_\_\_

**Question 8**

What are the main reasons for your company using a specific vermiculite grade?

**Question 9**

What do you like about Palabora Vermiculite's products?

**Question 10**

What barriers restrict your company from growing your vermiculite business?

## 9.4 Appendix 4: International customer's questionnaire.

### International Customers Questionnaire

Dear, Vermiculite Consumer

Company Name.....

#### Confidentiality

Your survey responses will be strictly confidential and data from this research will be reported only in the aggregate. Your information will be coded and will remain confidential. If you have questions at any time about the survey or the procedures, you may contact Ronald du Toit by email at the email address [ronald.dutoit@palabora.co.za](mailto:ronald.dutoit@palabora.co.za).

You are hereby invited to participate in Vermiculite market research survey. As part of my MBA studies your participation will enable Palabora Vermiculite (PV) to identify customer's product preference, why certain grades demand increase and others decrease and to determine alternative uses for finer grades vermiculite. Special attention regarding questions has been placed on the marketing of finer grade vermiculite.

#### Question 1

What type of Vermiculite grades is your company currently using?

☐ Large ☐ Medium ☐ Superfine ☐ Fine ☐ Micron

#### Question 2

For what type of applications does your company use vermiculite?

☐ Boards ☐ Construction ☐ Fire protection ☐ Insulation ☐ Agri-/Horticultural ☐ Refractory ☐ Friction lining

#### Question 3

What product qualities are the most important to your process?

a) Screen Sizing

☐ Unimportant ☐ Less important ☐ Important ☐ Very important ☐ Flexible

b) Non exfoliating content

☐ Unimportant ☐ Less important ☐ Important ☐ Very important ☐ Flexible

c) Yield

☐ Unimportant ☐ Less important ☐ Important ☐ Very important ☐ Flexible

d) Moisture analysis

☐ Unimportant ☐ Less important ☐ Important ☐ Very important ☐ Flexible

**Question 4**

How would you rate Palabora Vermiculite product availability?

**Question 5**

Is your company currently doing research and development (R&D) with regard to vermiculite?  
(Product development / product innovation)

If Yes, would your company be interested in PV assisting your company with R&D

If No, would your company be interested in assisting PV with R&D

**Question 6**

Has your company considered expanding their applications / product range.

If Yes, please print the application types. \_\_\_\_\_

**Question 7**

Do you think having a central warehouse in your country will or is beneficial to your business?

If YES, please state the reasons for this.

\_\_\_\_\_  
\_\_\_\_\_

**Question 8**

Does your company make use of other vermiculite suppliers?

If YES, please state the reasons for this.

\_\_\_\_\_  
\_\_\_\_\_

**Question 9**

What are the main reasons your company uses a specific vermiculite grade?

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**Question 10**

What barriers restrict your company from growing your vermiculite business?

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## 9.5 Appendix 5: South Africa customer's questionnaire feedback

Company name (Respondent)	V-Board	Xstrata	Insutech Insulation	Mandoval	Techniblend	Micronized
Q1	M,S/F	M	M,F,S/F, mic	L,M,F,S/F, Mic	M,S/F, Mic	M
Q2	R	R	C,H/A,R	C,H/A,R	C,R	H/A
Q3 a	2	3	2	2	2	2
Q3 b	2	2	2	2	2	2
Q3 c	2	2	2	2	2	2
Q3 d	2	3	3	3	3	2
Q4	1	1	2	2	2	1
Q5	Yes PV to assist	No	Yes PV to assist	Yes PV to assist	Yes PV to assist	Yes PV to assist
Q6	Yes construction	No	Yes ,Friction lining	No	No	Yes construction
Q7	Yes	No	Yes	Yes	Yes	Yes
Q8	Best product for end application	Best product for end application	Customer Requirement, best product for end application	Customer Requirement, best product for end application	Customer Requirement	Customer Requirement
Q9	Product availability& Quality	Product availability	Product availability	Product availability& Quality	Product availability& Quality	Quality
Q10	Demand	Demand	Cost of vermiculite	Cost of vermiculite	Cost of vermiculite	Business risk
Company name (Respondent)	Parma Nurseries	Rascal Seeds	Rosarium Nursery	CPS Seedlings	Ezigro Seedlings	Vermix Agric
Q1	M	M	M , F, Mic	L , M	M	L , M , F
Q2	H/A	H/A	H/A ,C	H/A ,C	H/A	H/A
Q3 a	2	2	2	2	2	3
Q3 b	3	3	2	3	2	2
Q3 c	2	2	2	2	2	2
Q3 d	3	3	2	2	3	3
Q4	1	1	2	1	1	2

<b>Q5</b>	<b>No</b>	<b>No</b>	<b>No</b>	<b>No</b>	<b>No</b>	<b>Yes , PV to assist</b>
<b>Q6</b>	<b>No</b>	<b>No</b>	<b>No</b>	<b>Yes refractory ,</b>	<b>No</b>	<b>Yes refractory ,</b>
<b>Q7</b>	<b>No</b>	<b>No</b>	<b>Yes</b>	<b>No</b>	<b>No</b>	<b>No</b>
<b>Q8</b>	<b>Customer Requirement</b>	<b>Customer Requirement</b>	<b>Customer Requirement</b>	<b>Best product for end application</b>	<b>Customer Requirement</b>	<b>Best product for end application</b>
<b>Q9</b>	<b>Quality</b>	<b>Quality</b>	<b>Quality</b>	<b>Quality</b>	<b>Quality</b>	<b>Product availability</b>
<b>Q10</b>	<b>Business risk</b>	<b>Demand</b>	<b>Demand</b>	<b>Cost of vermiculite</b>	<b>Business risk</b>	<b>Cost of vermiculite</b>

**Legend**

Grades			Applications			Question 3			Question 4		
Large	=	L	Construction	=	C	Flexible	=	1	Very Satisfied	=	1
Medium	=	M	Horti/Agricultural	=	H/A	Very important	=	2	Satisfied	=	2
Fine	=	F	Refractory	=	R	Important	=	3	Neutral	=	3
Superfine	=	S/F	Friction lining	=	FI	Less important	=	4	Dissatisfied	=	4
Micron =	=	Mic				Unimportant	=	5	Very Dissatisfied	=	5

## 9.6 Appendix 6: International customer's questionnaire feedback

Geographical area (Respondent)	Asia	America	Europe											
Q1	L,M,F,S/F, Mic	L,M,F,S/F	L,M,F,S/F, Mic											
Q2	C,H/A,R,FI	C,H/A,R,FI	C,H/A,R,FI											
Q3 a	2	3	2											
Q3 b	2	2	2											
Q3 c	2	2	2											
Q3 d	3	3	2											
Q4	3	4	5											
Q5	60% of customers are doing R&D , 90% want PV to assist	17% of customers are doing R&D , all want PV to assist	No , only improvements on existing end applications											
Q6	40% consider expanding , Mostly high , tech applications I.e construction refractory	100 % consider expanding, i.e. construction refractory	Yes , friction lining											
Q7	Yes , just in time (JIT) delivery to customers	Yes , just in time (JIT) delivery to customers	Yes , just in time (JIT) delivery to customers											
Q8	No	Yes , due to coarse grade availability and price	Yes , due to coarse grade availability and price											
Q9	Best product for end application	Customer requirement , best product for end application	Best product for end application – historical formulations ( if it works do not change it )											
Q10	Product availability price gap ( PV vs Competitors ) Lack of technology development	Product availability in coarse grades	Product availability in the coarser grades , cheaper substitutions , price of vermiculite and financial constraints , the limited number of applications											
Legend														
Grades				Applications				Question 3				Question 4		
Large	=	L		Construction	=	C		Flexible	=	1		Very Satisfied	=	1
Medium	=	M		Horti/Agricultural	=	H/A		Very important	=	2		Satisfied	=	2
Fine	=	F		Refractory	=	R		Important	=	3		Neutral	=	3
Superfine	=	S/F		Friction lining	=	FI		Less important	=	4		Dissatisfied	=	4