Using the Multiplicative Competitive Interaction Model of Market Share for Petroleum Brands in South Africa

A research report submitted to the faculty of Commerce, Law and Management, University of the Witwatersrand, in partial fulfillment of the requirements for the degree of Master of Business Administration.

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Abstract

This purpose of this research is to investigate the appropriateness and effectiveness of using the Multiplicative Competitive Interaction (MCI) model to simulate the market share of the competitors in the South African Petroleum industry, using Brand Equity measures as the inputs. By calculating the sensitivity of each Brand Equity measure, it is possible to provide data for marketing managers of the petroleum companies to enable them to make better decisions when allocating resources to future marketing campaigns.

The South African Petroleum industry represents a unique market in which to carry out this study. There are a limited number of large companies competing (with vast financial resources on which to draw), huge barriers to entry, price control of fuels through government legislation, fuel considered as a grudge purchase, and there is a common perception that all fuels are the same, no matter where purchased.

The MCI model used in this study has been formulated to simulate the market shares of multiple competitors, and overcomes the problems of modeling the market share of one company in isolation. Any action taken by a single company will affect not only their own market share but also that of their competitors in the industry. Therefore, market data was collected for all of the competitors and used as the basis for the model.

Brand equity measures such as Product Performance, Brand Loyalty and Brand Awareness are used as the inputs for this model. These measures were extracted from the literature and selected based upon their relevance to the petroleum industry. The sensitivity of these measures was calculated by modeling the actual market shares of the companies in three geographical regions of South Africa: Cape Town, Durban and Johannesburg & Pretoria.

The results achieved from the MCI model include an 83% fit between actual market share and modeled market share. The sensitivities of the Brand Equity measures are valid and clearly indicate the effect that each one has on market share. Various scenarios have been investigated to model the effects of Brand Equity measures changes on market share, with interesting results.

It appears that the MCI model can be used to model the petroleum industry, and provides valid results. It should be possible to use this model in many other industries as well.

Declaration

I, David Paul Beard, declare that this research report is my own work. It is submitted in partial fulfillment of the requirements for the degree of Masters of Business Administration at the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination in this or any other university.

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David Paul Beard

23rd February 2007.

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1.0 Introduction

1.1 Context of Research

It is a widely held belief that all fuel for sale in South Africa is the same, irrespective of the retail outlet from which it was bought, and therefore customers will choose a fuel brand based on the proximity of the service station when deciding to fill up. If this is true, then market share and Brand Equity are interchangeable and both would be a direct function of the number and location of the sites branded by each petroleum company.

However, experience in the petroleum field has led the author to believe otherwise. There appear to be many customers that are loyal to a particular brand, and even to a specific retail site. Interestingly, in some cases, the brand loyalty has been passed down through the generations.

If this latter scenario is, indeed, true, then there will be a discrepancy between the Brand Equity and the market share of the petroleum companies. By evaluating common measures of Brand Equity, and using them to model the market shares of the companies, it should be possible to determine which measures have the most profound effects. In this way, the marketing drivers for the petroleum industry should be clear.

1.2 The South African Petroleum Industry

A number of factors make the South African petroleum industry unique amongst retail operations; the main products sold are commodities that are difficult to differentiate, prices are controlled by government, there are only six petroleum companies competing, and these companies are now trying to differentiate their offerings by using brand extensions, such as convenience stores.

The market players are limited to six: Caltex, BP, Shell, Engen, Sasol and Total. Due to the vast capital requirements to enter this market, it is expected that there will be no new entrants in the foreseeable future. In fact, there have been some consolidations in the recent past that have seen the disappearance of Zenex, Trek and Sonap (all now owned by Engen), and deals between Sasol and Exel (Sasol, 2005a), and Sasol and Engen (Sasol, 2005b) are ongoing.

The retail price of petrol is pegged on a monthly basis as a result of a complicated formula that incorporates such factors as the crude oil price, the Rand/$ exchange rate and the selling price of fuels elsewhere in the world (Department of Minerals and Energy, 2005). There is a fixed margin per litre for the retailer. The wholesale price of diesel is fixed, allowing the retailer to set his own pump price. This leads to competition amongst retailers, although many motorists are unaware of the lack of price control on diesel; furthermore, the quantity of diesel sold from oil company forecourts is still relatively small compared to petrol sales.

All base fuels in South Africa are manufactured in one of five refineries: Caltex (Cape Town), BP/Shell Joint Venture (Durban), Engen (Durban), Sasol/Total Joint Venture (Sasolburg) and Sasol (Secunda). Most of the fuels are refined from crude oil, although Sasol uses their coal-to-fuel process to manufacture “synthetic” fuels. For obvious logistical reasons, the oil companies trade fuels with each other to reduce transport costs. As long as the fuel complies with the latest South African National Standards as specified by the South African Bureau of Standards (SABS), this should not be a problem. In the mind of the consumer, however, this information makes differentiation between fuel brands very difficult.

The fuel companies have taken many steps over the years in an attempt to differentiate their brands, the most obvious being the adoption of specific brand colours (Caltex: Deep Ocean Green and Red, BP: Yellow and Green, Shell, Yellow and Red, Engen: Deep Blue and Red, Total: Red and Orange, Sasol: White and Blue). There have been many marketing campaigns highlighting the superior performance of the particular fuel brands, especially after additives were included. Caltex, for example, are famous for their “CX3” leaded fuel, as endorsed by the Automobile Association (AA). One of the few areas left in which to stand out is customer service, and each fuel company has launched campaigns indicating how much more friendly or efficient they are when compared to the competitors.

More recently, an added dimension of differentiation has emerged – the convenience store on the forecourt. Unfortunately, not only have all the fuel companies followed this route, but all the convenience stores now look very similar as well. Despite distinct branding, different colours (often similar to, but distinct from, the corporate colours) and attempts at varied product and service offerings, the customer perception is that these stores are all very similar.

Despite all of this, there appears to be a common perception that all fuels and fuel brands are the same, providing the same levels of product performance and customer service. This should indicate that the Brand Equity of the oil companies should be very similar or at least related to the number of retail sites that they service. This report will show that many customers disagree with this theory, and will indicate which Brand Equity measures have the largest impact on market share.

1.3 Problem Statement

The purpose of this research is to determine whether Brand Equity measures can be used to model market share in the petroleum retailing market in South Africa.

1.4 Sub-Problems

The problem statement above can be broken down into two distinct sub-problems, as follows:

<u>Sub-problem 1</u>: To identify the measures of Brand Equity for the companies competing in the fuels retailing market in South Africa.

<u>Sub-problem 2</u>: To develop a model that estimates the sensitivities of the market share to Brand Equity measures, using actual market share data.

1.5 Delimitations and Limitations

The scope of this research will be limited to the six oil companies that have retail fuel outlets in South Africa (Caltex, BP, Shell, Engen, Sasol and Total), and will only study the Brand Equity associated with their retail operations. This will include all commercial activities that occur on retail sites, such as fuel sales, top-up oil sales, convenience stores and associated promotions.

The collection of information will be limited to the metropolitan areas of Gauteng, Cape Town and Durban, mainly due to the convenience of the data collection process in the main urban areas, with large populations from which to draw the samples.

Although most of the oil companies have operations other than the retail fuel outlets (for example, commercial fuel operations at large industrial and mining sites, lubricant manufacturing and sales, property investing, etc.), these will not be evaluated as part of these studies. It is possible, however, that the measurement of Brand Equity will be affected by customers' perceptions of these operations. These perceptions as they relate to the objectives of the study will be analysed and included where appropriate.

1.6 Assumptions

The following assumptions will be made:

- Suitable measures of Brand Equity will be found for the retail fuels market.
- Suitable measures of Brand Equity can be formulated.
- The sensitivities of the Brand Equity measures can be measured.
- It will be possible to collect sufficiently diverse and meaningful data within the time and budget constraints.
- The results of the Gauteng, Durban and Cape Town-based research will be representative for those particular regions, and for South Africa as a whole.
- The results of the study would be the same if carried out by a different researcher in the same market.

2.0 Literature Review

The concepts of Brand and Brand Equity, and methods to measure the latter have been dealt with extensively in the literature, and this will be reviewed first.

A number of researchers have proposed methods for linking Brand Equity measures to Market Share, and some of these studies were conducted in the field of petroleum retailing, but none of them have attempted to measure the effects that the Brand Equity factors have on Market Share. These articles will be reviewed next.

The Multiplicative Competitive Interaction (MCI) model has received some attention in the literature, and this will be reviewed. No references could be found where the MCI model had been used to measure the effect of Brand Equity factors on Market Share.

2.1 Brand

Before considering Brand Equity, it is important to define what is meant by "brand". In the marketing sense, brand can be considered as "a name, term, sign, symbol or design, or combination of these, that identifies the goods or services of one seller or group of sellers and differentiates them from those of the competition." (Campbell, 2002:208). Hence brand is a means by which consumers can differentiate between products and services that may otherwise be identical. Jourdan (2002:290) agrees: "A brand can be usefully defined as a visible attribute, physical and lasting, applied to an object to distinguish it."

However, brand has evolved beyond a "mark" that differentiates one product from another. Brand has become synonymous with the backing of the manufacturing company. "A brand is a promise a company makes to the customer, of what this product is going to deliver." (Campbell, 2002:208). Customers now tend to choose products based on the brand name attached to it, implying a certain guarantee of quality or back-up service. Depending on the strength of the brand identity, customers will pay more for a particular branded product when compared to the competition.

Brand as a concept has grown exponentially in recent years, to the extent that even politicians, filmstars, schemes, even entire countries can be "branded". Many companies have extended their brand building efforts from focusing on branded products up to corporate branding (Knox & Bickerton, 2003). The use of the corporate brand gives the consumer extra assurance that all the product or service brands that exist or may be launched under the corporate banner will provide a quality and reliable offering (Aaker, 2004). A good example of the use of the corporate brand to promote and underpin the sub-brands is in the Southern Sun group of hotels, with a portfolio of brands including "Holiday Inn", "Crown Plaza", "Southern Sun Resorts", "Garden Court" and "Express by Holiday Inn". Each brand has a distinct customer offering, but the client can be assured that each one will be backed by the corporate brand of Southern Sun.

Taking this concept further, it has been demonstrated that, for multiproduct (or multibrand) companies, purchasing decisions about one of their brands is influenced by the other brands in the portfolio (Anand & Shachar, 2004). The loyalty of these customers is strongly affected by the firm's profile and hence the corporate brand (examples provided include Volvo's profile of safety and Honda's profile of fuel-efficiency).

It is important to remember that brands can have negative as well as positive connotations. It is possible for a company to be rated very highly for brand awareness, but be rated very poorly for brand esteem.

An excellent summary of the many interpretations of "brand" is given by de Chernatony (2001), as follows:

- **Brand as a Logo**: A brand is easily identified by its logo or other visual signifiers, but there is far more behind the logo that needs to be included.
- **Brand as a Legal Instrument**: Many companies need to protect their brands from being copied by the use of registered trademarks and other legally-enforceable methods.
- **Brand as Company**: The company is often considered to be the brand, and corporate branding has reinforced this perception.
- **Brand as Shorthand**: With the vast amount of information available to consumers these days, recognisable brands are a way to cut down on the

processing time required. Brands have certain profiles that the consumers attribute to them, and this allows them to circumvent a lot of the marketing jargon when making a brand choice.

- **Brand as Risk Reducer**: In a similar way to *brand as shorthand*, choosing a brand with a known profile will reduce the risk to the consumer. These risks include performance of the brand, financial (value for money), time spent evaluating alternatives, social (will peers approve?) and psychological (will the consumer feel comfortable choosing the brand?).
- **Brand as Positioning**: Brand is often used to position the offering within the customer's mind, providing a simple association that can be immediately recognised. Once again, this is part of reducing the amount of information that needs to be processed before a purchasing decision is made.
- **Brand as Personality**: The idea of brand being an embodiment of the functional benefits of the product or service has been surpassed by an emotional angle, where the brand is given a personality, and consumers can identify with the characteristics of the personality.
- **Brand as a Cluster of Values**: Most brands, especially corporate ones, represent a cluster of values, and these are made known to the consumer, who can then identify with them. Brand extensions must encompass these values before being launched.
- **Brand as Vision**: Most companies have declared their vision, where they want to be headed in the future. The brand must reflect and enable this vision.

- **Brand as Adding Value**: Brand can be considered as the extra benefits that can be obtained by choosing the brand over the basic product or service.
- **Brand as Identity**: Similar to brand personality, brand identity gives an idea of the values, visions and direction of the manufacturer, and is used to communicate these to employees as well as customers.
- **Brand as Image**: Consumers create an image about a brand based upon their experiences and the company's marketing effort. This is a perceived image and may not be a true reflection of the brand.
- **Brand as Relationship**: This is an extension of the concept of brand personality; how do the customers relate to this personality?

Brand can also be considered in terms of the marketing effects that accrue to a product when compared to a product that is unbranded (Leuthesser, 1988; Farquhar, 1989; Aaker, 1991; Dubin, 1998; Ailawadi, Lehmann & Neslin, 2003 and Keller, 2003). These marketing effects have been described as Brand Equity.

2.2 Brand Equity

From the literature, it is clear that Brand Equity is the value that can be placed on a marketable product or service that is singularly due to the customer's perception of the brand when compared to an unbranded or undifferentiated product or service. Brand equity can be viewed either from the consumers' point of view, or from the companies'. From the consumer perspective, it is "a utility, loyalty, or differentiated clear image not explained by product attributes", while from the company angle it is "the incremental cash flow resulting from the product with the brand name compared with that which would result without the brand name" (Ailawadi, Lehmann & Neslin, 2003:1).

The management of Brand Equity is a means of gaining a competitive advantage in the marketplace (Lassar, Mittal & Sharma, 1995). In many cases, businesses have been valued or even sold at levels much higher than their Net Asset Value due to the Brand Equity that is embedded in the business. However, the market place is becoming so crowded with very similar products, and even brands, that creating brand equity is increasingly difficult (Bristow, Schneider & Schuler, 2002). A good example is the petroleum industry in South Africa, where many consumers consider all fuels to be the same, despite the best efforts of the companies to create distinct brand identities.

Many companies now measure their brand equity and even have dedicated brand managers, as well as consultancy services to evaluate and track brand equity (Ailawadi, Lehmann and Neslin, 2003).

Brand equity is a very powerful concept, but can provide both positive and negative influences. In some instances the brand name is so powerful that it has become synonymous with the actual product; for example, Sellotape for all sticky tapes, Bic or Biro for all ballpoint pens, Vaseline for all petroleum jelly products, Nugget for all shoe polishes, Hyster for all forklifts, Speedo for all swimming trunks, Xerox for all photocopiers, and so on. In other cases, the power of the brand can be used for negative purposes. A good example of this is the Pick 'n' Pay poison case, where the management were subjected to an extortion demand.

2.3 The Benefits of Measuring Brand Equity

As mentioned above, the measurement of brand equity is the cornerstone for making informed decisions about the management of the brand and spending of marketing budgets, as well as benchmarking against competitors (Aaker, 1996). It is also an essential component when considering such things as Brand Awareness, Brand Differentiation, Brand Extensions, Brand Leveraging and Co-Branding.

2.3.1 Brand Awareness

Brand awareness can be considered as how well current or potential customers recognise and recall a specific brand. When customers are considering which product to buy, it is strategically advantageous for the manufacturing company to own the brand uppermost in the customer's mind. It is even better if it is the *only* brand that is recalled (Campbell, 2002). This is considered as "top of mind" and means that the customer trusts the brand/product combination to most satisfy their needs. At the very least, the owner of the brand should aim for customers to "recall" their brand, maybe along with competitors' brands as well.

In terms of petrol marketing companies, there are only six brands in the marketplace (Caltex, BP, Shell, Engen, Sasol and Total – Exel is now a sub-brand of Sasol) and, with the exception of Exel, all are well established. In recent surveys (Conversa Global, 2003) all corporate brands are well known amongst all motorists – in other words, brand awareness in the petrol industry is very high. Initial studies indicate that brand awareness depends very strongly on only two factors: Market Share (very closely related to number of fuel retailing sites) and Advertising.

2.3.2 Brand Differentiation

Branding of products and services has become a way of differentiating otherwise similar offerings. However, according to Aaker (2003:83): "For many consumers, competing brands are essentially the same. In this context, it is increasingly hard to create and maintain points of differentiation, one of the main drivers of brand strength." This is especially true in the petrol retailing business; consumers are well aware that each fuel company sources their products from common suppliers. Consequently, the consumer has difficulty in differentiating between the different fuel brands, despite the fuel companies' attempts at differentiation by the use of functional additives and fuel brand names.

2.3.3 Brand Extensions

Brand extensions can be considered as a relatively low-risk method of entering new markets or product classes by using the existing brand equity to create trust and the perception of quality in a new product. Brand extensions can be used across markets, territories and even countries (Campbell, 2002). The use of an existing and trusted brand to introduce a new product is becoming a well-established procedure and is carried out by many companies.

The petrol retailers are no exception; the corporate brands are being used to market fuels, oils, additives, cleaning products and accessories, to name a few. In addition, these companies own many other brands (for example, Caltex has Havoline and Delo oils, then there is the convenience store brand, Star Mart) which have been used for many brand extensions. It is possible to purchase Havoline windscreen wiper blades, for example.

2.3.4 Co-Branding

Co-branding is a special form of brand extension, where two (or more) existing brands are combined as a new product or service, leveraging from the brand equity of the original brands (Washburn, Till and Priluck, 2000). There are a number of reasons for using a co-branding strategy, including increased exposure for all brands involved, trying to fend off competition and the sharing of marketing and advertising costs between the brands.

Co-branding enables companies to launch new products and services that customers will trust more than a completely new brand. It has been seen many times that the Brand Equity of the co-branded product is more than the sum of the original brands (Washburn, Till and Priluck, 2000). This even appears to be the case when a brand of high equity is co-branded with one of low equity.

There are four main strategies for co-branding: Joint promotions, where two brands combine in a promotional campaign (for example, when a petrol company convenience store combines with the latest children's movie as a promotional venture); joint advertising, where two brands are combined in a campaign (a good example is the use of Intel processors in many of the computer brands, and how they are always advertised together); complementary use of brands, such as many food brands and Coca Cola; and the production of a single product that actually combines two distinct brands, a good example being MacDonald's McFlurry ice cream with Cadbury's Astros.

There are a number of examples of co-branding in the petrol retailing market, and the frequency at which co-branding is being used is on the increase. A large use of the co-branding strategy is seen with the major forecourts, where there is often an in-house restaurant. Well known examples include Shell Ultra City with Whistle Stop restaurant, Engen One Stops with Wimpy, Total with Steers, BP with Wild Bean Cafe and Caltex Star Stops with BJs. There have even been attempts at co-branding smaller sites, with Caltex and MacDonald's sharing a forecourt in Cape Town.

With the advent of convenience stores on many forecourts, the level of co-branding has increased enormously. Joint promotions are used extensively, as is joint advertising. In some cases, there is even co-branding with brands that are both owned by the same oil company.

2.4 Measuring Brand Equity

It is often said that to manage something it must be possible to measure it first, and this is also true of Brand Equity. By measuring Brand Equity, a company is able to evaluate the effectiveness of its marketing programmes and manage future efforts. When a company owns multiple brands, especially when these brands may be competing with each other, it is important to manage the brand portfolio in such a way that all the brands will benefit in the long term (Aaker, 1996).

There are five broad purposes for measuring brand equity (Ailawadi, Lehmann & Neslin, 2003):

1. **For guiding marketing strategy and tactical decisions**: Knowing the level of brand equity will ensure that an appropriate strategy is chosen that will enhance or rectify the current position. For example, a low level of brand equity may well dictate a large investment in marketing, or an exit from the market.

2. **For assessing the viability of brand extensions**: A sound knowledge of the current strength of the parent brand is essential before making decisions about extending the brand into new categories. Not only could the brand extension fail, it could also damage the equity of the parent brand.

3. **For checking how effective marketing decisions are**: Clearly, a move in the level of brand equity after a particular marketing campaign is a direct measure of its effectiveness.

4. **For brand health tracking and comparison to competitors**: By measuring the brand equity and trending it over time, the health of the brand can be monitored. This may not be enough on its own, though. It is possible that the brand equity being measured remains static and all seems to be well, while the competitors' brand equity is increasing, effectively lowering the relative brand equity. This information should be available and can be acted upon.

5. **For assigning a financial value to the brand**: Companies are often valued based upon the Net Asset Value; however, the value is often much greater and this extra portion can be attributed to the brand equity. For the purpose of mergers and acquisitions and other accounting functions, an agreed numerical value of the brand equity is essential.

Most commonly, the effectiveness of marketing programmes are measured in financial terms such as sales, cost, margins, and profit and are normally short-term and historical in nature (Aaker, 1996). This also does not take into account what proportion of the effect can be attributed to the product or service compared to that of the brand (Jourdan, 2002).

Although the concept of brand equity is well understood, the means of measuring its value is open to discussion. It is becoming clear that "literature contains several oftendivergent viewpoints on the dimensions of brand equity, the factors that influence it, the perspectives from which it should be studied, and the ways to measure it." (Ailawadi, Lehmann & Neslin, 2003:1) Brand equity can be considered in two separate broad views (Bristow, Schneider & Schuler, 2002):

- Brand equity from the company viewpoint – comparing the value of the marketing mix for branded products versus unbranded products,
- Brand equity from the customer viewpoint – where the difference in customer response to branded and unbranded products is measured.

Building on this premise, it is possible to extend the facets of brand equity measurement to three (Ailawadi, Lehmann & Neslin, 2003):

- Customer mind-set : Assessing the awareness, attitudes, associations, attachments and loyalties that customers have towards a brand,
- Product-market outcomes : The benefit of brand equity as reflected in the marketplace, often measured by price premium,
- Financial market outcomes : Assessing the brand equity as a financial asset, often when sold or based on discounted cash flows of fees and royalties.

It appears to be very difficult to develop a measure of brand equity that incorporates all three of the above facets, especially if the final outcome is to be a single value. Each of the three has its merits and disadvantages; the final choice will probably depend on the type of product, the researchers and the required outcome.

It is necessary to develop a method of measuring Brand Equity in such a way that the results can be used to develop future marketing plans and allocate budgets to specific brands. As the value of the Brand is decided by the consumer, it is logical to develop Brand Equity measurements that are consumer-based (Jourdan, 2002; Vazquez, del Rio & Iglesias, 2002; Washburn & Plank, 2002 and Keller, 2003).

However, the literature has many examples of different methods of measuring Brand Equity; a number of these will now be reviewed.

2.4.1 Young & Rubicam Brand Asset Valuator.

This is probably the best known measure of Brand Equity and the one that made the concept known to the public. A survey is conducted annually of over 20 000 brands, assigning each with a Brand Asset Value (Value Based Management, 2005).

The overall Brand Value is made up of results from four factors: Differentiation, Relevance, Esteem and Knowledge. Differentiation deals with the uniqueness of the brand and how well consumers can identify it in the marketplace. Relevance is how important the brand is in the marketplace, and how appropriate the consumer feels it is.

Esteem is concerned with the quality perceptions and whether the brand keeps its promises. Knowledge tests the consumer's awareness and understanding of the brand.

Differentiation and Relevance are combined to give a measure of Brand Vitality, in other words its potential for growth. Esteem and Knowledge combined indicate the Brand Stature, or current power of the brand. This is illustrated below (Figure 1):

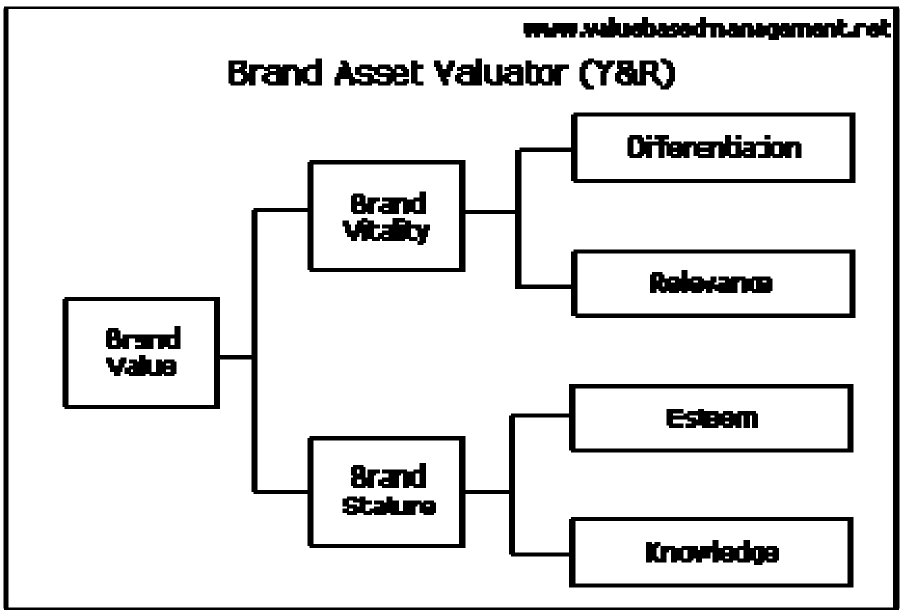

Figure 1: Brand Asset Valuator Model (Value Based Management, 2005)

The Brand Asset Value is calculated from survey responses of 230 000 participants globally and provides an overall value of a brand based on consumer perceptions across cultures and different markets.

2.4.2 Equalization Price (Swait, Erdem, Louviere & Dubelaar, 1993)

This method evaluates consumer perceptions of brand name, product attributes, brand image and consumer heterogeneity effects when comparing branded products with unbranded products. The consumers provide an indication of how much more they will pay for a particular brand in comparison to an unbranded product. This value is formulated as the Equalisation Price. It is based upon the Brand Equity that has been built up over time by marketing and advertising efforts, as well as consumer experiences (Swait et al, 1993).

The Equalisation Price is based purely on consumer perceptions and has no direct input from the brand itself, such as company share price, market share, marketing spend, etc. The method can be used both for historical brand information as well as a screening tool for future brands or brand extensions.

2.4.3 Five dimensions of customer-based brand equity (Lassar, Mittal & Sharma, 1995).

This measurement of brand equity is based solely on the perceptions of consumers. It does not consider price as a direct input, as it is the consumer's choice of brand based upon its actual price that creates the brand equity. In other words, consumers will purchase higher-priced, branded items that they feel will provide them with more value than similar, lower-priced items. (Lassar et al, 1995).

Brand equity is calculated from survey responses, based upon five components. These are:

Performance: The product must perform as expected to by the consumer, irrespective of price, otherwise sales and brand equity will drop.

Social Image: This is the social reputation associated with owning or using a particular brand, and can contribute strongly to overall brand equity. Social stigmas and peer pressures are determinants.

Price/Value: The perceived balance between the price of a product and the value of its properties is very important to the consumer. A higher price will generally indicate to the consumer to expect higher value. It is important to check if this is so, and investigate when it is not.

Trustworthiness: A consumer's trust in a brand can translate into brand value.

Identification/Attachment: It is argued that some customers become emotionally attached and unusually loyal to certain brands, and this is the fifth component to be evaluated.

Customers were surveyed using these components, and a strong correlation was found between Brand Equity, as measured by this method, and product prices. This method may be useful in setting prices of an existing or proposed product, based on customer perceptions of brand equity.

2.4.4 Brand Equity based on Consumer Utility following Purchase (Vazquez, del Rio & Iglesias, 2002).

In this study, the authors concentrate on measuring Brand Equity as a function of how the consumer perceives value based on the actual use of the brand after the purchase has occurred (Vazquez et al, 2002). It focuses on a concept of Brand Equity that they define as:

"*Consumer-based brand equity*: the overall utility that the consumer associates with the use and consumption of the brand; including associations expressing both functional and symbolic utilities." (Vazquez et al, 2002:28).

The authors have reviewed many previous studies that have produced a number of different measurement dimensions for ex-post utilities for brand equity, and reduced these to their four proposed dimensions as follows:

Functional Utility associated with the Product: This is a measure of how the product satisfies the actual needs of the consumer's physical environment, in other words, tangible attributes. These could be such things as comfort and performance.

Symbolic Utility associated with the Product: This refers to the utility obtained from psychological and social characteristics of the brand, such as style, colour and artistic design.

Functional Utility associated with the Brand Name: These refer to the utilities that satisfy functional or practical needs of the consumer, for example, the guarantee. These utilities may have links to the tangible attributes, but are identified by the consumer as being associated with the brand name.

Symbolic Utility associated with the Brand Name: These utilities satisfy the needs associated with the consumer's psychological and social environment and may include such things as self-image and generating positive social standing.

The authors used sports shoes as the subject of a detailed statistical study, using face-to-face interviews with survey questionnaires to collect the required data.

2.4.5 EquiTrend (Harris Interactive, 2005)

This is another commercial brand equity measurement, carried out by Harris Interactive (Harris Interactive, 2005) on behalf of the brand owners. Over 1 000 brands in 35 categories are tracked, using the ratings of over 20 000 consumers. It is intended as a marketing management tool to enable brand owners to compare their brand to direct competitors and other categories, identify strengths and weaknesses, assess the viability of advertising campaigns, identify opportunities for co-branding, partnerships and acquisitions, and support public and investor relations activities.

The EquiTrend Brand Value is based on five key measures, as follows:

Familiarity: The assumption here is that if more customers are familiar with the product then more of them will purchase it, as long as they like it. Certainly, the product needs to be familiar in the marketplace to have a high brand equity.

Quality: This measures the perceived quality of the brand as seen by the consumer. It indicates where the brand fits into the category (high-quality, high-cost or low-quality, low cost) and gives an idea of the value of the brand from the consumers' point of view. It can be influenced by advertising, associations and even nostalgia around the brand.

Purchase Intent: As expected, this measures the consumers' intention of purchasing the brand, regardless of price. This provides a clear idea of the value of the brand in the eyes of the consumer, and how much the brand will fit into their lifestyle.

Brand Expectations: This is a post-purchase measure, testing how well the brand met the consumer's expectations. This is compared to how the consumer felt about the brand before purchase, and how they felt about competing brands in the same category.

Distinctiveness: This measures how differentiated the brand is compared to its competitors. If all brands appear the same, brand equity will probably be very similar.

The first three measures are combined to give a measure of Brand Equity. When the last two measures are included, an extended measure known as Brand Health is formulated.

2.4.6 Brand Equity Ten (Aaker, 1996).

Aaker (1996) proposes a brand equity measure that can be used by all brands in all markets and across different countries. He points out that many companies market a number of diverse brands and have difficulty in allocating appropriate resources to each brand to maximise the marketing effort and, consequently, profitability.

The method of measuring Brand Equity is called the “Brand Equity Ten”. Aaker (1996) points out that this method is influenced by two methods mentioned above: Young & Rubicam’s Brand Asset Valuator, and Harris Interactive’s EquiTrend.

This measure comprises ten important factors that add up to an overall measure of a brand’s equity. These are split into 5 sections:

Loyalty Measures:	Price Premium
	Satisfaction/Loyalty
Perceived Quality/Leadership Measures:	Perceived Quality
	Leadership
Associations/Differentiation Measures:	Perceived Value
	Brand Personality
	Organisational Associations
Awareness Measures:	Brand Awareness
Market Behaviour Measures:	Market Share
	Price and Distribution Indices

As pointed out by Aaker (1996), not all of these measures are relevant in all situations, and this is the case with this research. For example, Price Premium can be eliminated as the petrol price is fixed. It may be an interesting theoretical exercise, however, to determine if loyal customers would pay more for their fuel if the industry were to become deregulated in the near future.

Considering the ten measures in detail:

Price Premium: Aaker (1996) points out that there is close correlation between how much a customer is prepared to pay for a product or service and its Brand Equity; "The price premium may be the best single measure of brand equity available because, in most contexts, any driver of brand equity should affect the price premium." (Aaker, 1996:107).

There are some anomalies, of course, where a company could have very high Brand Equity while supplying low cost products or services. A good example is the cut-price airlines, where the customer is being encouraged to pay a little as possible for the service.

An important consideration when measuring price premium is to segment the market. This will enable a clearer picture to emerge. It is suggested that the market is segmented into: loyal buyers, brand switchers and non-customers.

Customer Satisfaction/Loyalty: This can be measured directly with existing customers, as it is a post-purchase measure. It is an indication of the customers' perceptions. It is possible to obtain an idea of potential loyalty of non-customers by using purchase intent surveys, although this is less useful than the responses from current customers.

As it is most relevant to measure satisfaction and loyalty among the current customer base, it becomes important to understand the level of satisfaction and loyalty very well in this group. Brand Equity will increase if this group is growing.

Perceived Quality: Perceived quality is one of the most important measures in Brand Equity. It is associated with price premiums, brand usage and price elasticity. It can be measured in terms of the product or service quality level, as well as ranking against competitors, and testing whether the levels are consistent.

Often perceived quality is measured against competitor offerings, so it is important to select the correct competitors. Also, perceived quality will vary across the three customer segments: loyal customers, brand switchers and customers loyal to a competitor brand.

<u>Leadership/Popularity:</u> Brand Equity can be eroded despite perceived quality remaining the same, often due to competitor activity. Hence, it is important to measure how the brand is able to fare in the marketplace. Leadership is considered as the total effect of three separate dimensions: Sales leadership, innovation leadership, and customer acceptance. Firstly, sales leadership will clearly indicate that the brand has merit and good support. Secondly, products that are innovative can often topple sales leaders. Thirdly, a new product with low sales volumes but that is fashionable or “cool” may well be the future sales leader, as peer pressure ensures increasing exposure.

<u>Perceived Value:</u> Customers must feel that the brand provides good value for money (no matter how cheap or expensive the product or service is), as well as providing additional value when compared to the competitors’ offerings.

<u>Brand Personality:</u> This is a measure of the brand-as-person dimension. Many brands have emotional and aspirational images that attract customers to a particular product, even when the physical attributes of all the competitor products are very similar. This can be an important consideration when the products are used in a social environment. Many

companies have tried to develop brand personalities, and have often portrayed them using advertisements with “typical” consumers to attract certain market segments.

Organisational Associations: This measures the brand-as-organisation dimension and indicates how the customers perceive the company behind the product or service. This attribute is often used when products and brands are perceived to be very similar; the corporate brand is used to differentiate. Also, when an established corporate brand is launching a new product brand, the corporate brand can be used to persuade the customer of their backing and the inherent quality of the new offering.

It is possible for the perception of the organisational attributes, or corporate brand, to be different from those attributed to the products or services offered under the corporate brand. However, the strength and image of the organisation will often give the customer a good idea of what to expect from the product or service. In recent times, there have been extensive marketing campaigns to highlight corporate brands, providing a “halo” effect that assists in the marketing of the products.

Brand Awareness: Brand awareness describes how strongly the brand is entrenched in the consumer’s mind. This will clearly affect many of the perceptions about the brand and can lead to choosing that brand with consequential loyalty.

Brand awareness is often tested and reported at different levels such as the following:

- Recognition – asking if a specific brand can be remembered
- Recall – asking for all brands that can be remembered in the sector
- Top-of-Mind – which is the *first* brand to be recalled by customer
- Brand Dominance – if only one brand is recalled by customer
- Brand Knowledge – is anything known about the brand
- Brand Opinion – enough is known for the consumer to have an opinion about the brand

<u>Market Share:</u> In the simplest sense, market share gives a good measure of Brand Equity of the brand when compared to its competitors. In most cases, market share is easy to measure and relatively accurate.

<u>Market Price and Distribution Coverage:</u> Market share can be affected by price increases or decreases, as well as promotions. It is important to measure the price of the brand relative to its competitors.

Distribution coverage, also, can affect market share greatly. It is important to measure how far the distribution stretches and how many customers or potential customers have access to the brand.

In conclusion, Aaker (1996) talks about forming a single measure of Brand Equity using all of the ten dimensions of Price Premium, Satisfaction/Loyalty, Perceived

Quality, Leadership, Perceived Value, Brand Personality, Organisational Associations, Brand Awareness, Market Share and Price and Distribution Indices. He indicates that the final formula and balance will depend on the market, brand type, customer base, information available and the time and money that can be spent on the measurement. He argues that a simple summation of each of the dimensions is the best method, as the final result is not very sensitive to weightings that could be applied.

2.5 Modelling Market Share

It seems logical that Brand Equity measures should lead to a prediction of Market Share. A company with a high level of Brand Equity should dominate the market in sales. What is important in this research, however, is discovering which Brand Equity measures have the most effect (positive or negative) on the Market Share. This will enable Marketing departments to focus on those measures that influence Market Share the most.

A number of authors have considered methods of linking Market Share to various Brand Equity measures, mostly in an attempt to predict future market share. Naert and Weverbergh (1981) studied two markets; seven major petrol brands, and three major electric razor brands, both in Europe. In the first study, they model market share based on only one parameter: number of distribution outlets. In the second study, they consider how price, advertising spend and delayed market share affect actual market share. The authors were able to model Market Share with some success, but also concluded that further parameters would enable the models to exhibit increased accuracy.

Leeflang and Reuyl (1984) used the same methods to study the German cigarette market, using the variables advertising share and lagged market share. They successfully modelled the market share using these parameters. In similar studies, Ghosh, Neslin and Shoemaker (1984) modelled the market share of breakfast cereals, while Brodie and de Kluyver (1984) studied the New Zealand markets for chocolate biscuits, liquid detergents and toothpaste. One facet of all of these studies was to evaluate different modelling methods, including the attraction model (also called the Multiplicative Competitive Interaction model, or MCI). All studies agreed that Market Share modelling needs to include the influence of the competitors; it is not possible to accurately model the market share of a single brand in isolation.

A more recent study used a nested Logit function to model consumer choice (and therefore, Market Share) in the Indian laundry detergent market (Banerjee, 2004). A number of factors were utilised as inputs to Consumer Choice (see Figure 2). The calculated Consumer Choice was then compared with actual Market Share data. An important output of this model was the calculation of the sensitivities of these factors. In this way, marketing managers would be able to decide which factors will be the most beneficial when selecting areas for future marketing investment.

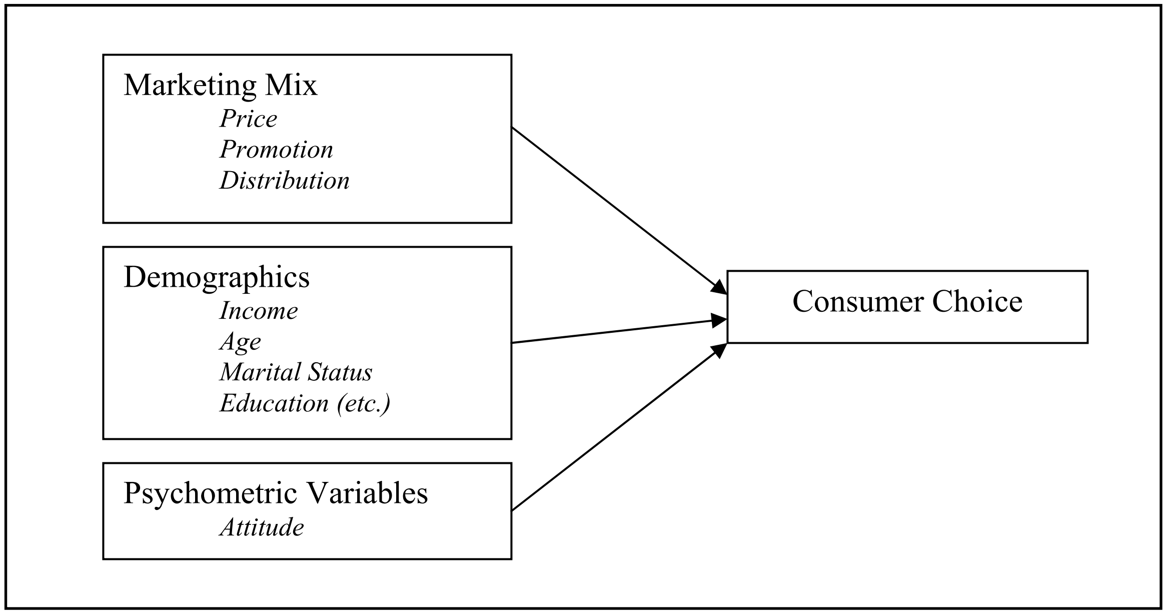

Figure 2: Factors used to Model Consumer Choice (Banerjee, 2004).

Another study considered customer-based measures of Brand Equity, and how they contributed towards the known Market Share of the fuel companies in New Zealand (Mackay, 2001). Ten measures were chosen, these being unaided recall, familiarity, weighted attribute of ten product features, value for money, quality of brand name, overall evaluation, derived brand index, price premium for switching, purchase intention and brand specific choice coefficient. Using multinomial logit regression, the relationship between the ten measures and brand choice was explored. Although a number of the measures exhibited correlation between them, the conclusion of the study indicated that most of them were convergent and had some predictive ability. Also, it was found that by studying a number of underlying factors rather than one, marketing managers will increase their chances of understanding what drives the market share for their company and their competitors.

2.6 Studies Based on the South African Petroleum Industry

Only three studies could be found that deal with the South African Petroleum Industry; of those, two model the effect that advertising has on sales, while the third considers the importance of branding to the consumer. All three make use of the limited number of variables available for study, due to the fact that prices are controlled, there are only a handful of competitors and all fuels are considered to be the same.

Leach and Reekie (1996) investigated how the advertising efforts of Sasol affected sales, during the period when Sasol fuel was available on all of the competitors' forecourts via a solitary, compulsory, pump. In this unique situation, (Sasol, as a government-funded fuels supplier, were bound by an agreement that excluded them from the retail marketplace, but were allowed to place a single pump on *all* forecourts) it was argued that the only factor that could affect sales of Sasol fuel was advertising. The relationship between sales and advertising spend, advertising timing and advertisement quality was modelled. The study, although not of direct use in this research, does indicate that advertising recall will be an important factor when considering Brand Equity measures.

The second study (Malumo, 2003), considers the effects of both advertising and share of distribution on sales and market share. Due to the lack of differentiation between fuel brands as well as the control of prices, advertising and number of distribution points (i.e. number of retail forecourts) were considered to be the most significant variables when considering sales and market share. Once again, this study indicates that advertising is an important input towards Brand Equity.

The third study (Marriott, 2006), considers the importance of branding in the South Africa petroleum retailing business, by canvassing users of these sites. It was found that there is a cluster of users that base their fuel purchasing decision almost entirely on brand. Further conclusions were drawn around how brand is more or less important based on the demographics of the respondent.

2.7 Summary of Literature Survey

The literature survey shows that the South African petrol retailing industry has been subjected to various studies, based on advertising effects and branding, but no attempt has been made to look at a range of Brand Equity measures and how they affect Market Share. This information provides direct feedback to the marketing managers of the fuel companies, enabling them to focus on issues that would provide maximum Market Share increases for minimum outlay.

The Multiplicative Competitive Interaction (MCI) model has been utilised in a number of studies, and has been shown to model Market Share very well. As all actions by one competitor affect the market share of the others, this model provides much better results than one that considers only a single competitor in isolation.

2.8 Factors leading to Brand Equity Measures

In order to build an MCI Model for Market Share for the South African petroleum retailing industry, the relevant Brand Equity measures need to be extracted. Based on the information contained in the literature survey, above, there are a number of factors that are common to many authors. These factors have been extracted and are discussed below.

Brand Equity Factor	References
Price Premium: When products or services are the same, the price premium is the extra that the customer will pay for a particular brand when compared to an unbranded product or service.	Swait, Erdem, Louviere & Dubelaar (1993) Aaker (1996) Lassar, Mittal & Sharma (1995)
Product Performance: The product must perform to the customer's expectations and satisfy their needs after purchase, based on the promise made by the brand before purchase.	Swait, Erdem, Louviere & Dubelaar (1993) Lassar, Mittal & Sharma (1995) Vazquez, del Rio & Iglesias (2002)
Perceived Quality: The customer will form an idea of the quality of the product based on the brand, price, advertising and experiences when using it.	Value Based Management (2005) Harris Interactive (2005) Aaker (1996)
Brand Awareness: The customer or potential customer will need to be aware of a brand and its attributes before purchasing it.	Value Based Management (2005) Lassar, Mittal & Sharma (1995) Harris Interactive (2005) Aaker (1996)

Perceived Value: The brand must offer good value for money, irrespective of price, as perceived by the customer.	Lassar, Mittal & Sharma (1995) Aaker (1996)
Brand Personality: How the brand is personalised and projects itself to the customer, even if the products are very similar. Also a way of differentiating between undifferentiated products. Could be distinctiveness, image, and other abstract attributes.	Aaker (1996) Value Based Management (2005) Swait, Erdem, Louviere & Dubelaar (1993) Vazquez, del Rio & Iglesias (2002) Harris Interactive (2005)
Purchase Intent/Loyalty: A measure of the loyalty of customers to a particular brand, and how likely they are to continue purchasing the brand.	Aaker (1996) Vazquez, del Rio & Iglesias (2002) Harris Interactive (2005)
Brand Expectations: The customer's perception of how well the brand keeps its promises, fulfils its expectations, maintains trustworthiness.	Value Based Management (2005) Lassar, Mittal & Sharma (1995) Harris Interactive (2005)

2.8.1 Price Premium

In terms of fuels, price premium should have very little effect on the measure of brand equity. Petrol prices are fixed; and this is, by far, the largest selling commodity on the forecourt. Any price premium effects will be limited to diesel fuel sales (still very small compared to petrol), lubricants and purchases from the convenience stores. As this study uses the market share of fuels as a basis for Brand Equity, this factor has very limited use, and is not considered in this exploratory work.

2.8.2 Product Performance

This is an important factor in determining brand equity. It seems to be commonly believed that all fuels are the same (based upon their common source), but marketing efforts, specialised additives, fuels branding and corporate branding should all have an effect on this, leading to a positive effect on brand equity.

Proposition 1: Product Performance can be used as a factor to measure Brand Equity for fuels retailing companies in South Africa.

2.8.3 Perceived Quality

In a similar way to "Product Performance" above, many motorists seem to think that all fuels are the same quality. This is borne out by the minimum requirement of a South African Bureau of Standards (SABS) approval of all fuels sold in South Africa. However, most fuel marketing companies use additives to boost the quality of their products, and invest many millions in marketing campaigns to illustrate this. Due to the similarity between this factor and Product Performance, only the latter is used for this study.

2.8.4 Brand Awareness

How aware a motorist is of a brand should have an effect when it is time to choose a fuel. It is important to measure the levels of brand awareness and see how this impacts on the levels of brand equity. In this study, Brand Awareness is split into two measures: Brand Awareness of Fuels, and Brand Awareness of Oils. This will provide an indication of whether the oils for sale on the forecourt have a significant effect on fuel sales.

Proposition 2: Brand Awareness can be used as a factor to measure Brand Equity for fuels retailing companies in South Africa.

2.8.5 Perceived Value

Value can be considered as a composite measure of performance and quality based on the price paid. As Product Performance has already been included, and price issues are to be excluded, then Perceived Value will almost certainly not add useful information to the study, and is not included.

2.8.6 Brand Personality

In a market where products and services are very similar, such as the fuel industry, brand personality may be critical in creating differentiation between brands.

There will probably be a strong link with marketing and advertising campaigns. This factor is considered in the study.

Proposition 3: Brand Personality can be used as a factor to measure Brand Equity for fuels retailing companies in South Africa.

2.8.7 Purchase Intent and Brand Loyalty

These factors can be considered as the most direct measures of brand equity, and should be strongly linked with market share. They are included in the study as two separate factors. Purchase Intent may be affected by location of sites, branded petrol cards and employees being forced to purchase certain brands by their employers. Brand Loyalty may be influenced by customer satisfaction, advertising and marketing campaigns, peer references and a personal affinity with the brand personality.

Proposition 4: Purchase Intent/Loyalty can be used as a factor to measure Brand Equity for fuels retailing companies in South Africa.

2.8.8 Brand Expectations

This measure is closely related to perceived quality, perceived value and brand personality, and may be dependent on these factors. It is excluded from this exploratory study, but it may be useful to include in further work in this field.

2.8.9 Summary

In summary, the following factors are considered the most suitable for building the MCI model for the petroleum industry in South Africa:

- Product Performance
- Brand Awareness – Fuel
- Brand Awareness Oil
- Brand Personality
- Purchase Intent
- Brand Loyalty

Proposition 5: The factors listed above can be incorporated into a statistical MCI model based on Market Share of the six oil companies in the three main marketing regions (Cape Town, Durban and Johannesburg & Pretoria).

These factors are used to build the MCI model. The output of the model will be the sensitivities of these factors to the Market Shares of the petroleum companies.

Proposition 6: The MCI Model can be used to indicate the sensitivities of all the factors above when considering Market Share, and therefore Brand Equity.

3.0 Research Methodology

3.1 Introduction

The data for this report was obtained from a questionnaire survey of respondents, all of whom are current purchasers of fuels. Further information was acquired about the market share of the six petroleum retailing companies, to ascertain whether brand equity has a direct relationship with market share.

The target of 1500 responses to the questionnaire was met, with 500 from each of the three main metropolitan areas of Cape Town, Durban and Johannesburg & Pretoria combined. Market share figures are available for these three areas, and provided an initial measure of Brand Equity for the regions.

This information was used to build a Brand Equity framework based on the Multiplicative Competitive Interaction (MCI) Model (Nakanishi & Cooper, 1974). This model was developed by Nakanishi and Cooper to quantify the effects of various parameters leading to purchase choice, and was based on more generic models originally devised separately by Huff (1962) and Luce (1959).

A general mathematical form of the MCI is as follows:

$$\pi_{ij} = \frac{\prod_{k=1}^{q} x_{kij}^{\beta_k}}{\left(\sum_{j=1}^{m} \prod_{k=1}^{q} x_{kij}^{\beta_k} \right)}$$

Where:

π_{ij} = the probability that a consumer in the *i*th choice situation selects the *j*th object;

x_{kij} = the *k*th variable describing object *j* in choice situation *i*;

β_k = the parameter for sensitivity of π_{ij} with respect to variable *k*.

Hence, π_{ij} is clearly a measure of consumer choice, and will therefore be equal to the market share of the various brands. x_{kij} is the variable leading to the consumer's choice; in this case the measures of Brand Equity. If all of the Brand Equity measures lead directly to a purchasing decision, then there will be a linear relationship, and the sensitivity (β_k) will be unity. By building a model that considers all of the Brand Equity measures identified above, as well as regional variations of responses and market share, the value of the sensitivities can be calculated, indicating which ones are important in the marketing efforts of the petroleum companies.

This model takes into account the interactions between competitors, rather than modelling a brand independently. However, it has not been widely used until recently due to the difficulty of calculating the required parameters, mainly due to the multiplicative terms in the equation. The advent of powerful personal computers and the development of spreadsheet software such as Microsoft Excel has given this model a new lease of life.

3.2 Sample Information

The sample population was drawn from the metropolitan areas of Johannesburg & Pretoria, Durban and Cape Town. The total number of respondents was 1509, with 503 coming from each area. Screening questions were used to ensure that all respondents are over 18 years of age (the legal age at which a driver's licence may be obtained), that they are current users of fuels, obtained from retail sites, and that they are free to choose which fuel brand they use. It was also established that none of the respondents is an employee of any of the fuel retailing companies.

In an attempt to minimise any unfair bias towards any of the fuel retailing companies, the respondents that express a loyalty towards a particular brand were limited to match the current market share of that company. Although a sample of 1500 is statistically sufficient to avoid such bias, it was felt that this measure will ensure it will have no effect on the final results.

Data was collected by a professional market research company, and reported as numerical and qualitative information with no interpretation being carried out by them.

3.3 Research Instrument

The data was collected by means of a questionnaire. An example is included in Appendix 1.

3.4 Validity and Reliability

Validity is a measure of whether the results of the study are valid when applied to the population as a whole, while reliability is an indication of whether another researcher carrying out the same study in the same environment would obtain the same results.

3.4.1 External Validity

By using 1500 participants in the survey it was possible to statistically show external validity for this research.

3.4.2 Internal Validity

The literature survey has consistently highlighted a number of factors that are considered important when measuring brand equity. By using these factors as a basis for the research, there will be strong internal validity. Part of the purpose of this research is to suggest a framework for future use that will have excellent internal validity.

3.4.3 Reliability

Reliability cannot be guaranteed in an opinion-based study, but can be increased by selecting larger sample sizes. This was the purpose of using 1500 respondents in the questionnaire survey.

4.0 Results and Discussion

The questions listed in Appendix 1 were presented to 1509 respondents, 503 from each of the urban regions of Cape Town, Durban and Johannesburg & Pretoria combined. In all cases, the first response was recorded; the choices were one of the six brands (BP, Caltex, Engen, Sasol, Shell and Total), “other”, “don’t know” and “none”, depending on the question posed. This raw data was compiled into a spreadsheet along with the Market Share for each company, and each set was amalgamated into an overall score. This information is in Table 1 (overleaf).

It is clear that some questions elicited a number of non-Brand responses, while others did not. In order to standardise the data, each data point was expressed as a percentage, Table 2.

4.1 Correlation Testing

Based on information in the literature survey, as well as logical reasoning, it is reasonable to assume that the responses gathered for “Purchase Intent” and “Brand Loyalty” would lead directly to a measure of Market Share. Hence, there should be exact correlation between the actual Market Share and these measures. It may also be reasonable to assume that there would be a close correlation between all of the Brand Equity measures used in this research and Market Share. Before proceeding with the MCI model, it is important to test the relationships between Market Share and the Brand

	Company, other response	Market Share	Product Performance	Brand Awareness - Fuel	Brand Awareness - Oil	Brand Personality			Purchase Intent	Brand Loyalty
						"An Ethical Company"	"An environmentally friendly company"	"A company with a strong heritage in this country"		
Cape Town	BP	15.53%	124	107	55	127	143	104	88	66
	Caltex	33.52%	145	141	112	131	128	109	157	116
	Engen	18.32%	60	77	31	62	54	63	64	62
	Sasol	7.55%	25	13	10	26	26	80	13	9
	Shell	19.32%	123	132	111	130	118	120	107	73
	Total	5.76%	25	31	21	27	34	27	21	23
	Other	-	1	2	94	0	0	0	4	0
	Don't Know	-	0	0	45	0	0	0	0	0
	None	-	0	0	24	0	0	0	49	154
Durban	BP	16.39%	107	117	67	118	138	112	90	83
	Caltex	19.14%	134	109	90	121	106	91	107	81
	Engen	32.14%	94	118	54	101	95	105	102	81
	Sasol	3.31%	13	12	3	21	23	46	9	6
	Shell	15.75%	125	114	122	113	111	110	107	76
	Total	13.27%	30	33	24	29	30	29	28	24
	Other	-	0	0	114	0	0	10	3	0
	Don't Know	-	0	0	20	0	0	0	0	0
	None	-	0	0	9	0	0	0	57	152
Jhb+Pta	BP	19.30%	165	172	38	182	215	186	149	106
	Caltex	10.50%	76	82	60	70	62	62	78	76
	Engen	27.49%	71	83	19	70	63	62	63	63
	Sasol	9.94%	65	55	21	69	63	93	47	26
	Shell	20.43%	97	74	70	78	72	69	67	52
	Total	12.34%	24	26	14	25	24	26	23	26
	Other	-	5	11	199	9	4	5	5	13
	Don't Know	-	0	0	61	0	0	0	0	0
	None	-	0	0	21	0	0	0	71	141
Totals	BP	18.25%	396	396	160	427	496	402	327	255
	Caltex	14.99%	355	332	262	322	296	262	342	273
	Engen	27.42%	225	278	104	233	212	230	229	206
	Sasol	8.26%	103	78	34	116	112	219	69	41
	Shell	19.30%	345	320	303	321	301	299	281	201
	Total	11.78%	79	90	59	81	88	82	72	73
	Other	-	6	13	407	9	4	15	12	13
	Don't Know	-	0	0	126	0	0	0	0	0
	None	-	0	0	54	0	0	0	177	447

Table 1: Questionnaire responses and Market Shares

	Company, other response	Market Share	Product Performance	Brand Awareness - Fuel	Brand Awareness - Oil	Brand Personality			Purchase Intent	Brand Loyalty
						"An Ethical Company"	"An environmentally friendly company"	"A company with a strong heritage in this country"		
Cape Town	BP	15.53%	24.65%	21.27%	10.93%	25.25%	28.43%	20.68%	17.50%	13.12%
	Caltex	33.52%	28.83%	28.03%	22.27%	26.04%	25.45%	21.67%	31.21%	23.06%
	Engen	18.32%	11.93%	15.31%	6.16%	12.33%	10.74%	12.52%	12.72%	12.33%
	Sasol	7.55%	4.97%	2.58%	1.99%	5.17%	5.17%	15.90%	2.58%	1.79%
	Shell	19.32%	24.45%	26.24%	22.07%	25.84%	23.46%	23.86%	21.27%	14.51%
	Total	5.76%	4.97%	6.16%	4.17%	5.37%	6.76%	5.37%	4.17%	4.57%
	Other	-	0.20%	0.40%	18.69%	0.00%	0.00%	0.00%	0.80%	0.00%
	Don't Know	-	0.00%	0.00%	8.95%	0.00%	0.00%	0.00%	0.00%	0.00%
	None	-	0.00%	0.00%	4.77%	0.00%	0.00%	0.00%	9.74%	30.62%
Durban	BP	16.39%	21.27%	23.26%	13.32%	23.46%	27.44%	22.27%	17.89%	16.50%
	Caltex	19.14%	26.64%	21.67%	17.89%	24.06%	21.07%	18.09%	21.27%	16.10%
	Engen	32.14%	18.69%	23.46%	10.74%	20.08%	18.89%	20.87%	20.28%	16.10%
	Sasol	3.31%	2.58%	2.39%	0.60%	4.17%	4.57%	9.15%	1.79%	1.19%
	Shell	15.75%	24.85%	22.66%	24.25%	22.47%	22.07%	21.87%	21.27%	15.11%
	Total	13.27%	5.96%	6.56%	4.77%	5.77%	5.96%	5.77%	5.57%	4.77%
	Other	-	0.00%	0.00%	22.66%	0.00%	0.00%	1.99%	0.60%	0.00%
	Don't Know	-	0.00%	0.00%	3.98%	0.00%	0.00%	0.00%	0.00%	0.00%
	None	-	0.00%	0.00%	1.79%	0.00%	0.00%	0.00%	11.33%	30.22%
Jhb+Pta	BP	19.30%	32.80%	34.19%	7.55%	36.18%	42.74%	36.98%	29.62%	21.07%
	Caltex	10.50%	15.11%	16.30%	11.93%	13.92%	12.33%	12.33%	15.51%	15.11%
	Engen	27.49%	14.12%	16.50%	3.78%	13.92%	12.52%	12.33%	12.52%	12.52%
	Sasol	9.94%	12.92%	10.93%	4.17%	13.72%	12.52%	18.49%	9.34%	5.17%
	Shell	20.43%	19.28%	14.71%	13.92%	15.51%	14.31%	13.72%	13.32%	10.34%
	Total	12.34%	4.77%	5.17%	2.78%	4.97%	4.77%	5.17%	4.57%	5.17%
	Other	-	0.99%	2.19%	39.56%	1.79%	0.80%	0.99%	0.99%	2.58%
	Don't Know	-	0.00%	0.00%	12.13%	0.00%	0.00%	0.00%	0.00%	0.00%
	None	-	0.00%	0.00%	4.17%	0.00%	0.00%	0.00%	14.12%	28.03%
Totals	BP	18.25%	78.73%	78.73%	31.81%	84.89%	98.61%	79.92%	65.01%	50.70%
	Caltex	14.99%	70.58%	66.00%	52.09%	64.02%	58.85%	52.09%	67.99%	54.27%
	Engen	27.42%	44.73%	55.27%	20.68%	46.32%	42.15%	45.73%	45.53%	40.95%
	Sasol	8.26%	20.48%	15.51%	6.76%	23.06%	22.27%	43.54%	13.72%	8.15%
	Shell	19.30%	68.59%	63.62%	60.24%	63.82%	59.84%	59.44%	55.86%	39.96%
	Total	11.78%	15.71%	17.89%	11.73%	16.10%	17.50%	16.30%	14.31%	14.51%
	Other	-	1.19%	2.58%	80.91%	1.79%	0.80%	2.98%	2.39%	2.58%
	Don't Know	-	0.00%	0.00%	25.05%	0.00%	0.00%	0.00%	0.00%	0.00%
	None	-	0.00%	0.00%	10.74%	0.00%	0.00%	0.00%	35.19%	88.87%

Table 2: Standardised Results

Equity measures to establish if this is true. In order to test this, a correlation matrix was built in Excel, and the results are shown in Table 3.

		Market Share	Product Performance	Brand Awareness - Fuel	Brand Awareness - Oil	"An Ethical Company"	"An environment ally friendly company"	"A company with a strong heritage in this country"	Purchase Intent	Brand Loyalty
Cape Town	BP	15.53%	24.7%	21.3%	10.9%	25.2%	28.4%	20.7%	17.5%	13.1%
	Caltex	33.52%	28.8%	28.0%	22.3%	26.0%	25.4%	21.7%	31.2%	23.1%
	Engen	18.32%	11.9%	15.3%	6.2%	12.3%	10.7%	12.5%	12.7%	12.3%
	Sasol	7.55%	5.0%	2.6%	2.0%	5.2%	5.2%	15.9%	2.6%	1.8%
	Shell	19.32%	24.5%	26.2%	22.1%	25.8%	23.5%	23.9%	21.3%	14.5%
	Total	5.76%	5.0%	6.2%	4.2%	5.4%	6.8%	5.4%	4.2%	4.6%
Durban	BP	16.39%	21.3%	23.3%	13.3%	23.5%	27.4%	22.3%	17.9%	16.5%
	Caltex	19.14%	26.6%	21.7%	17.9%	24.1%	21.1%	18.1%	21.3%	16.1%
	Engen	32.14%	18.7%	23.5%	10.7%	20.1%	18.9%	20.9%	20.3%	16.1%
	Sasol	3.31%	2.6%	2.4%	0.6%	4.2%	4.6%	9.1%	1.8%	1.2%
	Shell	15.75%	24.9%	22.7%	24.3%	22.5%	22.1%	21.9%	21.3%	15.1%
	Total	13.27%	6.0%	6.6%	4.8%	5.8%	6.0%	5.8%	5.6%	4.8%
Jhb+Pta	BP	19.30%	32.8%	34.2%	7.6%	36.2%	42.7%	37.0%	29.6%	21.1%
	Caltex	10.50%	15.1%	16.3%	11.9%	13.9%	12.3%	12.3%	15.5%	15.1%
	Engen	27.49%	14.1%	16.5%	3.8%	13.9%	12.5%	12.3%	12.5%	12.5%
	Sasol	9.94%	12.9%	10.9%	4.2%	13.7%	12.5%	18.5%	9.3%	5.2%
	Shell	20.43%	19.3%	14.7%	13.9%	15.5%	14.3%	13.7%	13.3%	10.3%
	Total	12.34%	4.8%	5.2%	2.8%	5.0%	4.8%	5.2%	4.6%	5.2%
Market Share		1.000	0.621	0.693	0.499	0.580	0.485	0.427	0.721	0.751
Product Performance		0.621	1.000	0.958	0.771	0.980	0.931	0.853	0.960	0.906
Brand Awareness - Fuel		0.693	0.958	1.000	0.710	0.972	0.931	0.855	0.974	0.954
Brand Awareness - Oil		0.499	0.771	0.710	1.000	0.681	0.565	0.497	0.764	0.718
"An Ethical Company"		0.580	0.980	0.972	0.681	1.000	0.976	0.913	0.944	0.888
"An environmentally friendly company"		0.485	0.931	0.931	0.565	0.976	1.000	0.920	0.887	0.834
"A co. with a strong heritage in this country"		0.427	0.853	0.855	0.497	0.913	0.920	1.000	0.816	0.720
Purchase Intent		0.721	0.960	0.974	0.764	0.944	0.887	0.816	1.000	0.969
Brand Loyalty		0.751	0.906	0.954	0.718	0.888	0.834	0.720	0.969	1.000

Table 3: Correlation Results

It is clear from these results that there is not a strong correlation between Market Share and any of the Brand Equity measures. This is an unexpected result, and indicates that MCI model will produce significant values for the sensitivities associated with each Brand Equity measure.

Considering the correlation between the Brand Equity measures themselves, there does seem to be significant correlation between some of the measures, indicating that they are measuring the same thing, at least in the perception of the respondents.

4.2 Multiplicative Competitive Interaction (MCI) Modelling

Using Excel, an MCI model was constructed. Based on the Brand Equity measure responses, and assuming initial sensitivities (β) to be unity, the Market Share for each petroleum company in each geographical area was estimated by the model. These values, as expected, were very far from the actual Market Shares, and the difference between these and the actual values were transferred to a separate table, and totalled. The Solver function in Excel was used to minimise this total difference by varying the sensitivities of the Brand Equity measures. The following values were returned:

Brand Equity Measure	**β value**
Product Performance	2.012
Brand Awareness - Fuel	0.806
Brand Awareness - Oil	- 0.501
Brand Personality “Ethical Company”	- 2.352
Brand Personality “Environmentally Friendly Company”	- 0.649
Brand Personality “Strong Heritage in this Country”	0.330
Purchase Intent	0.675
Brand Loyalty	0.104

Table 4: β Values for Brand Equity Measures

These results display a wide variation (from 2.012 to -2.352) in the sensitivities of the Brand Equity measures used in this research. This indicates that a small change in some of the measures (especially “Product Performance” and “Brand Personality ‘Ethical Company’”) can have a dramatic effect on Market Share. These effects will be investigated later.

In order to confirm that the results from the model are acceptable, the Actual Market Shares were plotted against the Modelled Market Share. All values were plotted as Logit values (i.e. LN(Market Share/1-Market Share):

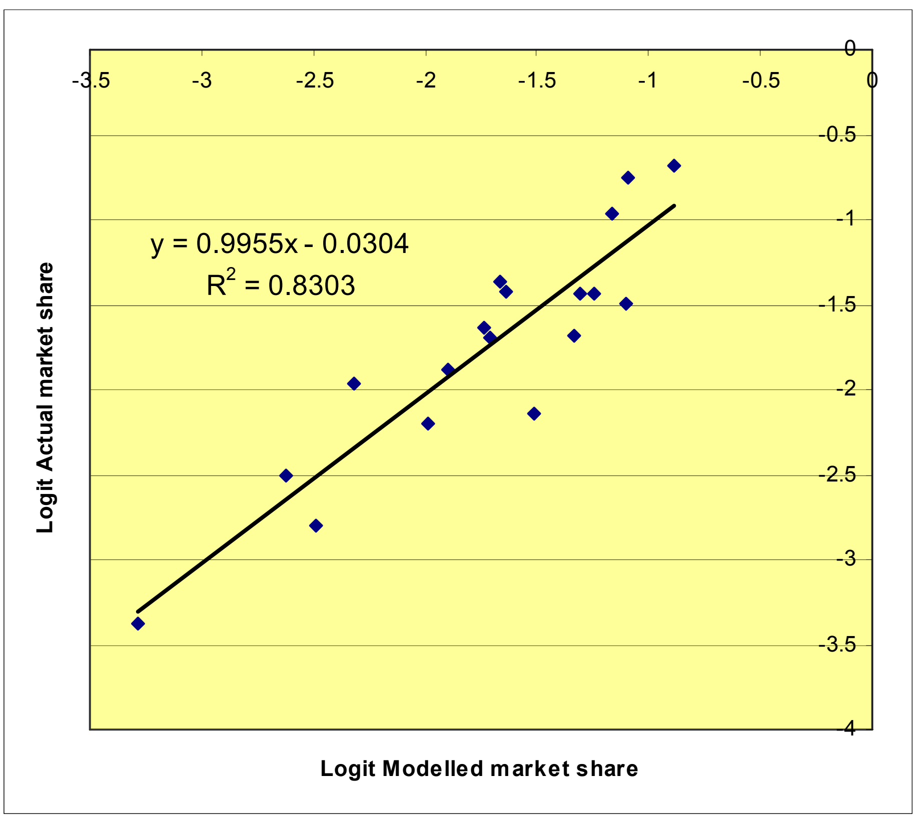

Figure 3: Correlation between Actual and Modelled Market Shares

This indicates that there is excellent correlation between the Modeled and Actual Market Share values, with 83% of the data explained by the MCI model.

4.3 Discussion of MCI Model Results

An MCI model for estimating Market Share based on Brand Equity measures in the Petroleum Retailing industry was built. The Brand Equity measures were extracted from the literature, and selected based upon their relevance to the industry. A questionnaire was formulated encompassing questions related to these measures. Over 1500 respondents, one third from each of the metropolitan areas of Cape Town, Durban and Johannesburg & Pretoria combined provided the information required for the study to be completed.

When these responses were loaded into the model, each Brand Equity measure was assigned a sensitivity (β) of 1 and the model was run. Using these values, it was clear that the calculated Market Shares did not match the Measured Market Shares. By using the Solver function in Excel, these sets of parameters were matched as closely as possible by varying the sensitivities. Most of the optimised sensitivities are very far from unity, and three of them are negative, indicating that an increase in the Brand Equity measure would lead to a drop in Market Share.

From the results obtained, it appears that Product Performance has the greatest positive effect on Market Share ($\beta = 2.012$), indicating that an increase of x in the customers' perception of Product Performance should lead to an x^2 increase in Market Share. To illustrate the effect of changes in Market Share based on changes in Brand Equity measures, some "what if" scenarios are now considered.

4.3.1 Increased "Product Performance" Brand Equity Measure

From the MCI model, it is clear that Product Performance is the Brand Equity measure that has the greatest effect on Market Share. It is also the marketing message most often used by the petroleum companies in an attempt to create Brand Differentiation. Due to this, it is difficult to change the customer's perception of Product Performance in favour of one particular brand.

For the purpose of this scenario, however, it will be assumed that one petroleum company (Caltex) has been able to increase the customers' perception of their Product Performance by 5% in the Cape Town region (from 28.8% to 33.8%) at the expense of the other five companies, all of which lose their Product Performance score in proportion to their Market Share. The resultant changes in modelled Market Share are shown in Figure 4 below.

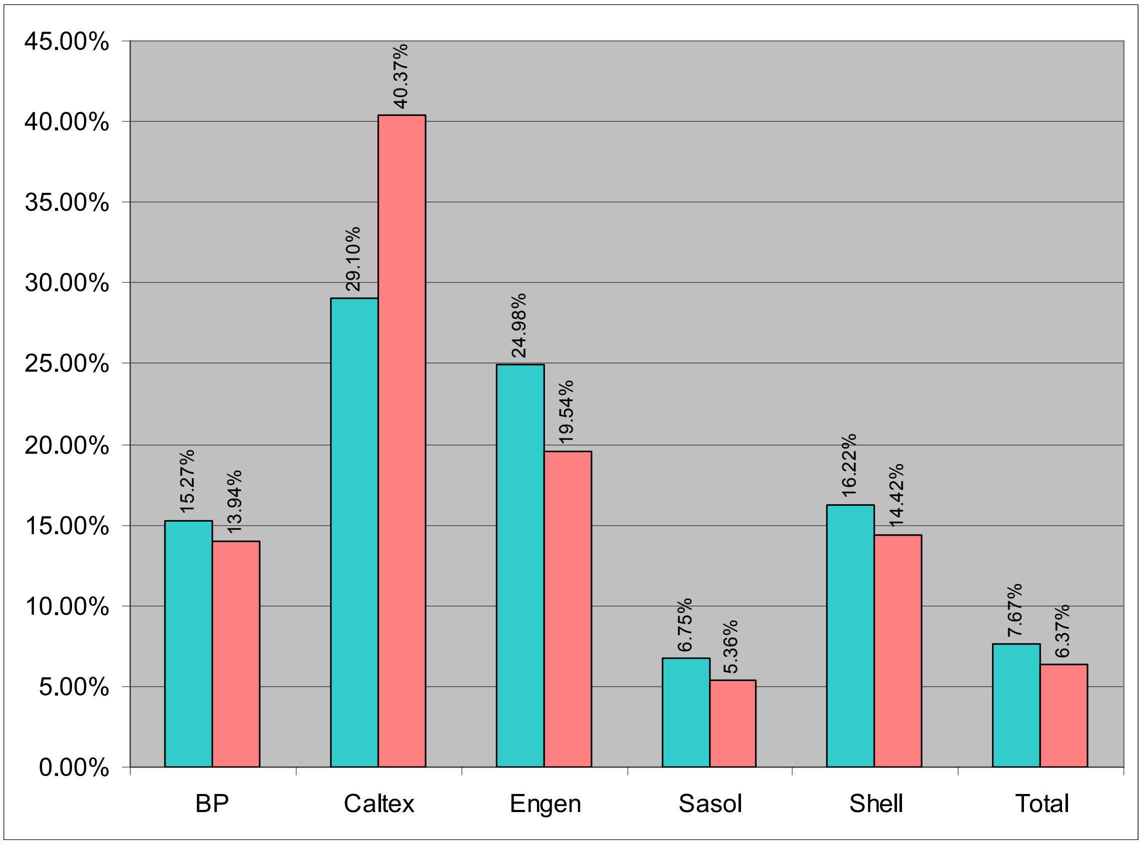

Figure 4: Changes in the Modelled Market Shares based on a 5% increase in Product Performance rating for Caltex (before = blue, after = red).

From this analysis, it is clear that a 5% increase in the Brand Equity measure "Product Performance" would lead to an 11% growth in Market Share for Caltex, at the expense of all of the competitors. Of these, Engen would lose the most, dropping by over 5%. This is a clear indication of the sensitivity of this measure.

4.3.2 Increased Brand Personality measure, "An Ethical Company".

In stark contrast to Product Performance above, the Brand Personality measure "An Ethical Company" has a sensitivity of -2.352. This should indicate that any improvement in this Brand Equity measure would actually lead to a *decrease* in Market Share. Using the same scenario as 5.3.1, the model was recalculated, and the results are shown in Figure 5, below.

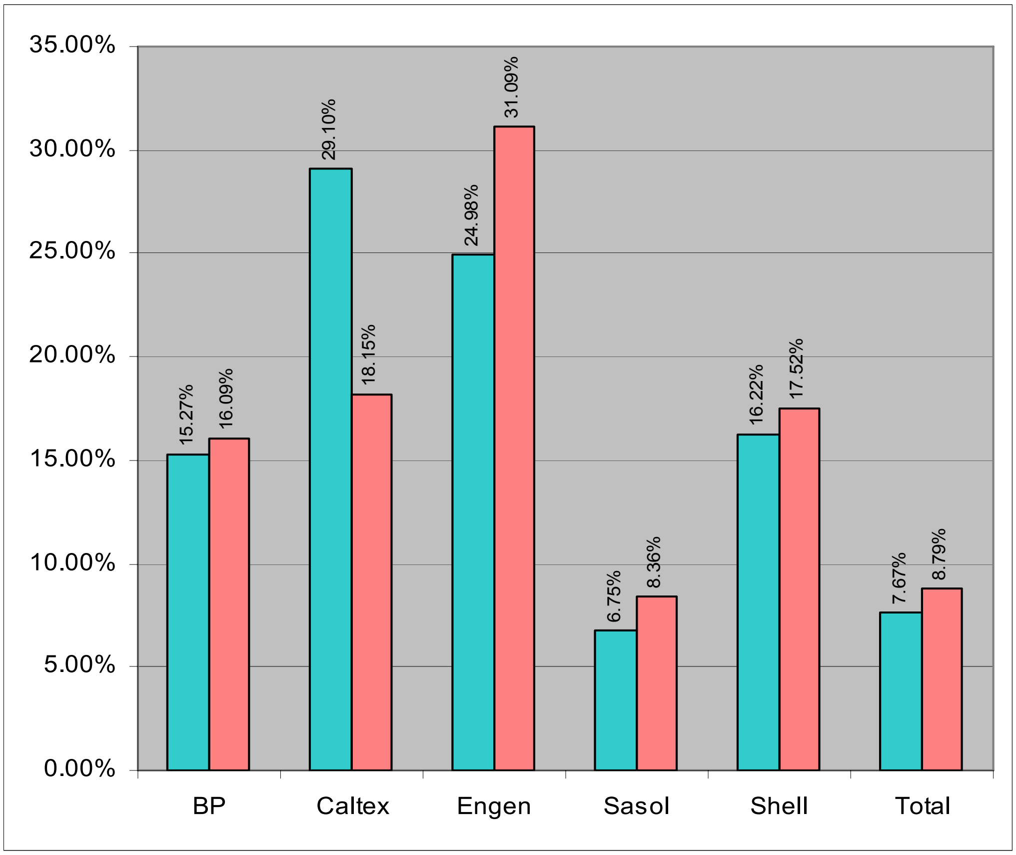

Figure 5: Changes in Modelled Market Share based on a 5% increase in Brand Personality ("An Ethical Company") for Caltex (before = blue, after = red).

As expected, this graph indicates that there is an inverse relationship between the measure and Market Share. It is actually in the interest of the petroleum companies to prove they are not ethical! The magnitude of the effect of a 5% increase in this measure is also incredible, with Caltex losing a projected 11% Market Share. All of their competitors gain Market Share in the process, despite not actually taking any action themselves.

This certainly seems to be an anomalous result, especially in today's business environment with the emphasis being on corporate governance, environmental protection and ethical trading. This could be the subject of further research.

4.3.3 Increased Brand Awareness (Fuel)

The previous examples used the maximum and minimum values of sensitivity in this MCI model, and consequently the changes in Market Share were high while there were only small changes in the underlying measures. Brand Awareness (Fuel), however, has a sensitivity that is close to unity (actually 0.81), which should indicate that Market Share should vary in a similar manner to the underlying measure.

This was tested in the same way as the two previous scenarios, with a 5% increase in the Caltex Brand Awareness of Fuel, and a Market Share related decrease in the competitors' shares. The results are summarised in Figure 6, below.

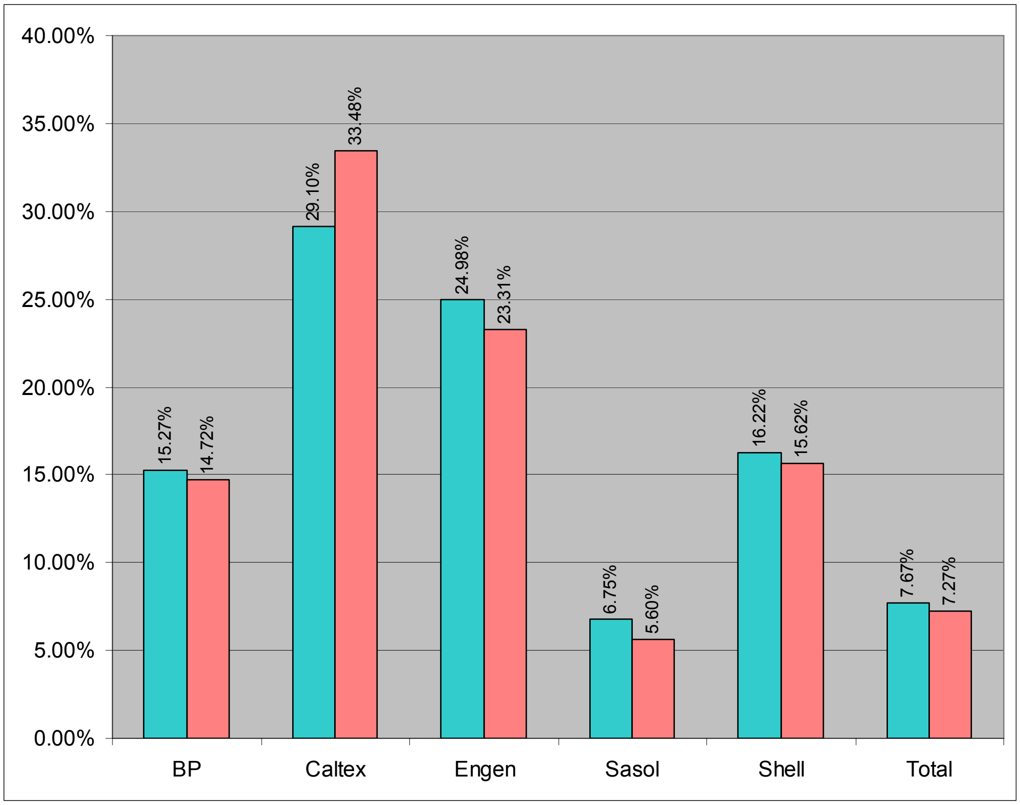

Figure 6: Changes in Modelled Market Share based on a 5% increase in Brand Awareness (Fuel) for Caltex (before = blue, after = red).

As predicted, the growth in Market Share is in line with the increase in Brand Equity measure, indicating that a sensitivity close to unity leads to this scenario.

4.3.4 Increased Brand Loyalty

The last scenario to be considered is the Brand Loyalty measure, as it has a sensitivity close to zero ($\beta = 0.1$). Following the logic from the previous scenarios, a value of sensitivity close to zero should indicate that the Market Share will not change much as the Brand Equity measure is varied. The results are shown in Figure 7.

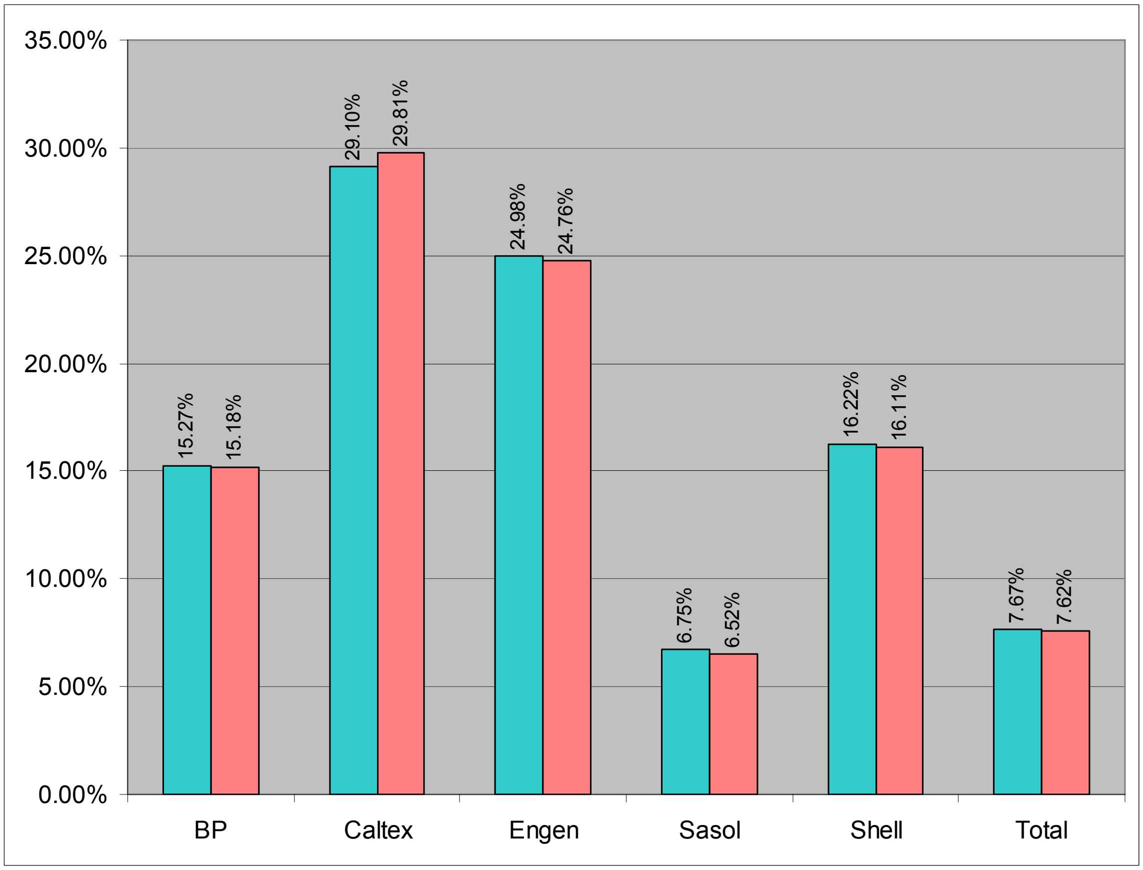

Figure 7: Changes in Modelled Market Share based on a 5% increase in Brand Loyalty for Caltex (before = blue, after = red).

As expected, the changes in Modelled Market Share are very small compared to the previous scenarios using the same changes in the various Brand Equity measures.

4.4 MCI Model Analysis

Once the MCI Model has been built using the responses from a suitable questionnaire, it is possible to carry out many different analyses. This is where the model becomes useful to the marketing managers, as they plan marketing and advertising campaigns. It is clear from the previous sections that the greatest returns, in terms of increased Market Share, will be achieved if the marketing efforts are focussed on the Brand Equity measures with the highest sensitivities.

However, it is not directly evident how much the Market Share will vary with an increase in the Brand Equity measures. This was investigated using the same variables as in all the previous scenarios. Each of the eight Brand Equity measures was increased, in 5% increments, for Caltex in the Cape Town section. The Brand Equity measures were decreased for the competitors in proportion with their actual Market Shares. In some instances, this caused the modelled Market Shares to decrease to zero, and when this occurred, these results were discarded.

The increased Brand Equity measures were inserted into the MCI model, and the calculated Market Share was recorded for each Brand Equity measure increase. The results are presented in Figure 8, below, and they clearly indicate how the modelled Market Share varies with each Brand Equity measure.

It is important to consider that this is one of many possible scenarios, as the results have been calculated for only one petroleum company in one geographical area, with all Brand Equity measures being equally deducted from all of the competitors' scores. Also, each Brand Equity measure was changed independently of the others; it may be possible to extract useful information by varying them as groups.

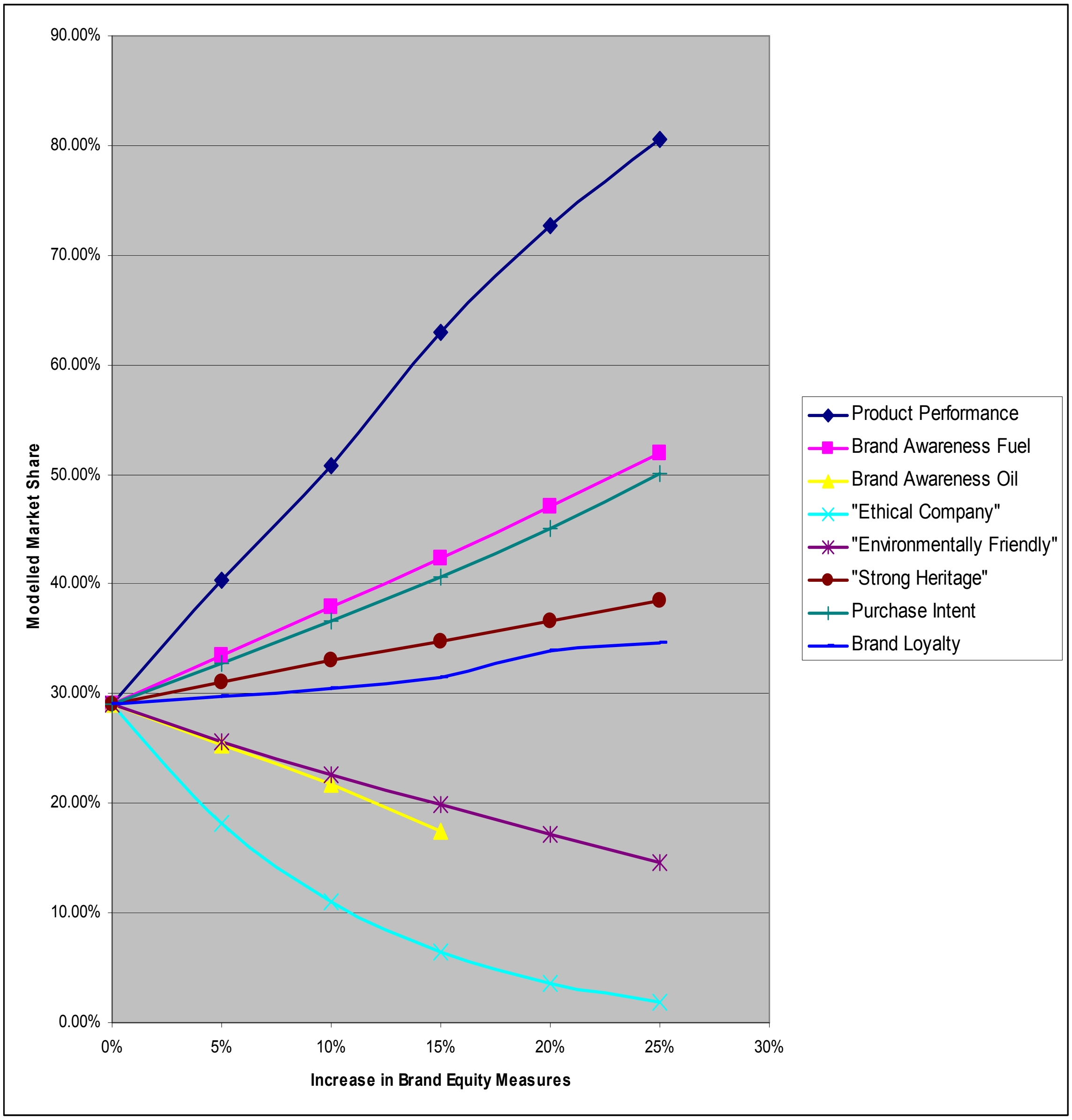

Figure 8: Plot of Modelled Market Share vs. Increasing Brand Equity Measures for all eight measures based on Caltex in the Cape Town region

Figure 8 clearly reflects the outcome of the preceding scenarios, with those measures with negative sensitivities losing Market Share, and the larger the sensitivity, the greater the change. It is interesting to note that many of the measures appear to have a linear relationship with Modelled Market Share. The exceptions are Brand Personality, “An Ethical Company”, which has the largest negative sensitivity and varies as a hyperbole; and Brand Loyalty and Product Performance, both of which have a kink in the middle of the plot.

From this graph, however, it appears that if the sensitivity is positive then an increase in Brand Equity measure will lead to a continuous increase in Market Share, at least within the limits of the range of this graph. There does not appear to be a diminishing returns rule for this model.

The model indicates that the customer’s perception of Product Performance has the greatest effect on Market Share, and it is interesting to note that most of the petroleum companies do, indeed, focus on this in their marketing campaigns. Due to the similarity of these campaigns, however, it seems that there is little effect on the customers’ perception and, therefore, minimal changes in Market Share.

5.0 Conclusions

The MCI model has provided the basis for modelling the relationship between Market Share and Brand Equity measures in the South African petroleum industry. By using Brand Equity measures identified in the literature, and collecting data quantifying these measures from three different urban areas, a mathematically robust result was achieved. With the help of the Solver function in Excel, the model was optimised by varying the sensitivities of the measures. The resultant sensitivities indicate how the modelled market share varies when the Brand Equity measures are changed, to model situations that Marketing Managers could attempt to produce in the marketplace.

This is a first attempt at using the MCI model in the petroleum industry, and it may be possible to improve the end result. Although the Brand Equity measures have a sound grounding in the literature, it may be possible to provide a better selection by changing, reducing or increasing the measures used. As this is a multiplicative model, a preponderance of a particular type of measure (for example, there are three Brand Personality measures used in this model) may skew the model.

Similarly, the way that the questionnaire is worded and structured may provide differences to the model. There is evidence of some correlation between some of the measures, and this could possibly be eliminated by careful wording of future questionnaires. A market such as the South African petroleum industry is well known to consumers, and all the brands are well known and clearly identifiable. This makes differentiation difficult for the consumers, and may not provide a true reflection of their preferences.

However, it appears that the MCI model works well for the petroleum industry, and provides valid results in terms of modelled market share compared to actual market share, and the sensitivities of the various brand equity measures used. There was good correlation between the market shares, with 83% of the actual market share accounted for by the modelled market share.

In terms of the research propositions, the following conclusions can be drawn:

5.1 Product Performance

Proposition 1: Product Performance can be used as a factor to measure Brand Equity for fuels retailing companies in South Africa.

The results from the MCI model indicate that Product Performance is a valid brand equity measure when modelling market share in the petroleum industry. With a sensitivity of 2.012, Product Performance has a notable impact on market share calculations, and the various scenarios clearly show that a small change in the consumer's perception of Product Performance will lead to a large increase in market share. This is reflected in the marketplace, where most of the petroleum companies focus solely on how their fuels perform when devising marketing campaigns.

5.2 Brand Awareness

Proposition 2: Brand Awareness can be used as a factor to measure Brand Equity for fuels retailing companies in South Africa.

This study indicates that Brand Awareness (for both fuel and oil) is a valid brand equity measure for the MCI model. Brand Awareness: Fuel has a sensitivity of 0.806, and the model shows a fairly linear, proportional relationship between this measure and modelled market share. All of the brands available in South Africa are well established and well known by most consumers. In terms of the first brand mentioned when asked about Brand Awareness, there may be a close link with Brand Loyalty (Table 3 does indicate a correlation coefficient of 0.954). Further research may be able to establish a better method of measuring Brand Awareness.

Brand Awareness: Oil has a negative sensitivity of -0.501. This indicates that a better awareness of the oil brands available on the forecourt will decrease market share, and this may be an area that could be investigated further. As oil sales are relatively small compared to fuel sales, this may need to be removed from the brand equity measures altogether.

5.3 Brand Personality

Proposition 3: Brand Personality can be used as a factor to measure Brand Equity for fuels retailing companies in South Africa.

In this study, three measures of Brand Personality were used, and all three produced valid results in the MCI model, although with widely varying sensitivities. "Ethical Company" produced a sensitivity of -2.352, the most negative of all the measures, and indicates that the consumers will avoid the company that markets itself as being the most ethical. This is an interesting concept at the moment, where most oil companies are seen to be of limited ethical ability, so any company trying to broadcast an ethical message may, indeed, lose market share.

A similar argument could be true for the second measure, "Environmentally Friendly Company". It is a common perception that the oil companies are not environmentally friendly, and any attempts to prove otherwise may lead to a decrease in market share. This is supported by the negative sensitivity (-0.649).

The measure with a positive sensitivity (0.330), "Strong Heritage in this Country", tends to indicate that the consumer sees this attribute as an attractive one. However, although this measure has a positive sensitivity, it has a small value, indicating a small increase in market share for a large increase in this measure.

5.4 Purchase Intent/Loyalty

Proposition 4: Purchase Intent/Loyalty can be used as a factor to measure Brand Equity for fuels retailing companies in South Africa.

Both Purchase Intent and Brand Loyalty produced valid results in the MCI model, with positive but small sensitivities, indicating that an increase in either brand equity measure in the consumer's perception will lead to a lesser but positive increase in market share. It would be logical to assume that both of these measures would have a directly proportional relationship with market share, so clearly there are other factors that affect the outcome of this study, and it may be worthwhile investigating this in future research.

5.5 Brand Equity Factors

Proposition 5: The factors listed above can be incorporated into a statistical MCI model based on Market Share of the six oil companies in the three main marketing regions (Cape Town, Durban and Johannesburg & Pretoria).

The MCI model that has been produced has successfully incorporated all of the factors listed in Propositions 1-4, and produced a meaningful result. Although the model may be improved by choosing different factors, the results achieved with these ones is certainly satisfactory for an initial attempt at modelling the petroleum industry.

5.6 Factor Sensitivities

Proposition 6: The MCI Model can be used to indicate the sensitivities of all the factors above when considering Market Share, and therefore Brand Equity.

As shown in Section 5, the MCI model has produced valid sensitivities for all of the factors used, and has provided a mathematically valid link between the brand equity measures and the actual market shares. The resultant sensitivities can be explained in the context of the South African petroleum industry.

6.0 Recommendations for Further Research

The results of this research will be of interest to the marketing departments of the companies competing in the petroleum industry in South Africa, and may help them in making future marketing decisions. However, there are areas where changes may improve the model, and areas where further work may extend its usefulness and accuracy in modelling the petroleum industry.

6.1 Selection of Brand Equity Measures

The selection of the Brand Equity measures used in this research was based on a survey of the literature and knowledge of the petroleum industry. It is possible that this may have produced the correct selection of Brand Equity measures for the MCI model. It is equally possible, however, that a different selection may have produced a better fit for the modelled market share.

As the MCI model is multiplicative, and a number of calculations are based on products of these measures, the results can be affected greatly by a slight change in the measures used. It may also be possible to select measures that are very similar, thus skewing the results, or changing the market share model.

A potential area of future research in this case would be to investigate how to select the Brand Equity measures for the MCI model to ensure an accurate market share model. To check that this has been achieved, the measures would need to be used in the MCI model. It is reasonable to assume that the best selection of Brand Equity measures would have been achieved when the correlation between modelled and actual market shares is closest to unity.

In a similar way, it is possible that selecting too many or too few measures will compromise the MCI model. By adding or removing the measures from the model, the best fit could be achieved.

The Research Problem could be stated as:

"To determine which Brand Equity measures are the most relevant when building an MCI model for the South African petroleum retailing industry, and to investigate the optimum number of measures in the model."

The Research Methodology would need to include the surveying of petroleum marketing professionals, customers and external marketing consultants to establish the most relevant measures, and the building of an MCI model that can be easily modified by changing the number and type of Brand Equity measure to investigate which selection provides the best match between actual market share and modelled market share. The resulting model would probably be easily adaptable for many other purposes.

6.2 Verification of the MCI model sensitivities

Some of the sensitivities resulting from this model may appear to be inconsistent with common perceptions of what happens in the marketplace. An example is the large negative value for the sensitivity associated with Brand Personality: An Ethical Company. At the moment, a number of the petroleum companies are trying hard to present an ethical face to the customers; if this model is correct, this is actually costing them market share.

It would be of great value to verify the sensitivities generated by the MCI model. This could be done by following the advertising campaigns of the petroleum companies, and linking the dominant messages with resultant market share changes. It may be possible to carry this out as a retrospective study, investigating previous campaigns and historical market share movements.

The Research Problem could be stated as follows:

"To verify the MCI model sensitivities of the chosen Brand Equity measures in the South African petroleum industry by investigating changes in Market Shares based on changes in Brand Equity measures due to specific advertising or marketing campaigns."

The main Research Methodology would be the MCI model, with multiple iterations based on information gathered about current or past advertising campaigns.

6.3 Extending the MCI Model into other Industries

Due to the success in using the MCI model to simulate the petroleum industry in this report, it is logical that this method may be well suited to modelling other industries, especially those that have a limited number of competitors or a dominant few. As long as the brand equity measures can be established, and the consumers can be canvassed for their perceptions of the measures, then an MCI model can be built. Good examples of industries to model could include: banking, airlines, car rentals, large hotel chains, supermarket chains, and so on.

In this case, the Research Problem would be very similar to this research, along the lines:

"Using the Multiplicative Competitive Interaction Model of Market Share for (*chosen industry*) in South Africa."

The Research Methodology would use the MCI model, and would be very similar to this research.

6.4 Summary

The intention of this research is to investigate whether the MCI model can be used to model the petroleum industry in South Africa. As this has been successfully achieved, there are many opportunities to improve or extend this model, both within the petroleum industry and within other industries. It is hoped that this report will form the basis for many more.

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Appendix 1 – Questionnaire

Brands from which to choose:
BP, Caltex, Engen, Sasol, Shell, Total

Factor 1: Product Performance.
Question 1: Which brand do you most strongly associate with the following statement: “Has fuel which helps your car perform at its best”

Factor 2: Brand Awareness: Fuel.
Question 2: When you think of fuel for your vehicle, which brand comes to mind first?

Factor 3: Brand Awareness: Oil.
Question 3: When you think of oil for your vehicle, which brand comes to mind first?

Factor 4: Brand Personality.
Question 4: Which brand do you most strongly associate with the following statement: “An ethical company”
Question 5: Which brand do you most strongly associate with the following statement: “An environmentally friendly company”
Question 6: Which brand do you most strongly associate with the following statement: “A company with a strong heritage in this country”

Factor 5: Purchase Intent.
Question 7: If you were low on fuel in an unfamiliar area and you came to a line of places that sold fuel, which one brand would you use?

Factor 6: Brand Loyalty.
Question 8: If you are a regular customer of one brand, which one is it?