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(Research)

Do Product Variants Appeal to Different Segments of Buyers within a Category?

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Abstract

Market segmentation, the process of dividing a market into different groups of buyers, plays an important role in marketing according to many authors (Dibb and Simkin, 2008; Dickson and Ginter, 1987; Frank *et al.*, 1972; McDonald and Dunbar, 1998; Smith, 1956; Wedel and Kamakura, 2000; Weinstein, 1994; Wind, 1978). The rationale for market segmentation is that buyers can be classified into different groups, which share similar needs or buying behaviour. A marketing mix can then be designed to satisfy the needs of each particular group of buyers.

A vast body of marketing literature has paid attention to market segmentation at the brand level. Within that body of work there has been a heavy focus towards segmentation *methods*. While some studies have discovered segments of buyers for different competing brands, these have often been confined to single product categories (e.g. Grover and Srinivasan, 1987; Kamakura and Russell, 1989). As a result, this has raised concerns about the extent (and logic) of market segmentation at the brand level among marketing scholars (e.g. Hammond *et al.,* 1996; Hoek *et al.*, 1993; Wright and Esslemont, 1994; Wright, 1996). Indeed, large-scale empirical studies have shown that competitive brands rarely appeal to buyers with different demographic or psychographic characteristics (Dawes, 2006; Fennell *et al.*, 2003; Hammond *et al.*, 1996; Kennedy *et al.*, 2000; Kennedy and Ehrenberg, 2001;).

Although *brand* is an important attribute for the choice of a particular product, other attributes such as pack-size and formula cannot be ignored (Fader and Hardie, 1996; Andrews and Manrai, 1999). Indeed, research has shown that there is higher loyalty towards product attributes rather than brands in the wine category (Jarvis *et al.*, 2007). Therefore, despite the lack of evidence of market segmentation for competing *brands* as shown in recent research, market segmentation for different product *variants* might occur.

This thesis therefore will address that issue by examining whether different product variants appeal to buyers with different demographic characteristics. The thesis

examines the product variants (such as formula, pack-size, form, pack-type) of a range of brands in nine consumer goods categories. The thesis applies the cross-tabular analysis method for segmentation of product variants. It calculates and compares the market share of each variant within each demographic group. If a variant has a higher market share within a specific demographic group than the overall average, this indicates segmentation at the product variant level.

The findings show that there are many differences in the market shares of product variants among different demographic groups of buyers. The largest differences are found within the age and employment status variables. This indicates that functionally different product variants tend to draw different demographic-based segments of buyers. For example, the healthy variants such as diet soft-drinks and decaffeinated instant coffee appeal more to an older buyer segment. In contrast, the regular or standard variants appeal more to a younger aged segment. This is an important contribution. Results in the literature on brand segmentation have shown that demographics play little role in explaining brand preference. One reason might be because marketers often develop multiple variants for a brand. This thesis has focused on the variants, which appears to be a more fruitful avenue for segmentation. With the findings across nine product categories, it is concluded that demographics such as age and employment status are good bases for market segmentation of product variants. Thus, marketing researchers and practitioners are encouraged to use demographics in market segmentation studies at the product variant level. Furthermore, the fact that functionally different product variants attract different segments of buyers indicates that target marketing is implementable at the product variant level.

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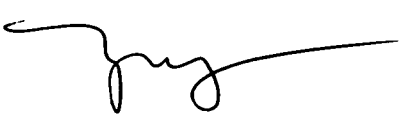
Declaration

I declare that this thesis presents work carried out by myself and does not incorporate without acknowledgement any material previously submitted for a degree or diploma in any university; and to the best of my knowledge it does not contain any materials previously published or written by another person except where due reference is made in the text.



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Publications relevant to the Thesis

Trinh, G., Dawes, J. and Lockshin, L. (2009), "Do product variants appeal to different segments of buyers within a category", ***Journal of Product and Brand Management***, Vol. 18, No. 2, pp. 95-105.

Trinh, G., Dawes, J. and Lockshin, L. (2008), "Pack-size segmentation – An examination at the individual level using a person-situation variable". ***ANZMAC conference 2008***, Sydney, Australia.

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Chapter 1 Introduction

1.1 Chapter Introduction

This chapter outlines the central theory, the research questions, the research method, and the main findings of the thesis.

1.2 Topic of Research

This thesis examines whether product variants appeal to buyers with different demographic characteristics. In other words, it examines what is called observable general and product-specific segmentation – the association between consumer characteristics and buying behaviour within a specific category (Wedel and Kamakura, 2000).

Market segmentation is generally accepted to be one of the most fundamental and important topics in marketing (Dibb and Stern, 1995; Wind, 1978). Based on market segmentation, marketers can identify groups of buyers with different needs and preferences. Then, different marketing activities can be designed to satisfy the needs of distinct groups of customers. As such, market segmentation is said to be an important strategy for marketing success (e.g. Dibb and Simkin, 2008).

Segmentation is based on the idea that consumers are heterogeneous in needs, wants, preferences or other market-related behaviour. This is certainly an uncontroversial idea. The challenges for segmentation research have been to identify if and how this heterogeneity in behaviour maps onto brand or product choice. The question of market segmentation regarding brand and product variant choice has been discussed in the marketing literature for decades e.g. (Collins, 1971; Fennell *et al.*, 2003; Johnson, 1971; Kennedy *et al.*, 2000). Brand-level segmentation would occur if there were differences between the buyers of competing brands such as Coke and Pepsi. Product-variant segmentation would occur if there were differences between the buyers of different SKU (stock keeping units) -based variants such as small and large pack-sizes, diet and regular drinks (Kennedy *et al.*, 2000).

At the brand level, findings on market segmentation have shown that competitive brands rarely appeal to buyers with different demographic or psychographic characteristics (Dawes, 2006; Hammond *et al.*, 1996; Kennedy *et al.*, 2000; Kennedy and Ehrenberg, 2001; Fennell *et al.*, 2003). The lack of brand segmentation could be explained by the following reasons: (1) Different brands in the same category tend to offer a similar range of product variants (Ehrenberg *et al.*, 2004). For example, Coke and Pepsi both offer diet and regular drinks; small, medium and large pack-sizes. This broadens their appeal, and as a result, Coke and Pepsi appeal to similar

customers; (2) The phenomenon of repertoire buying - the buyers of one brand also buy other brands in the category therefore it is less likely a particular brand has a unique customer base (e.g. Ehrenberg, 1988).

Despite the lack of evidence of market segmentation for competing *brands* as shown in recent research, market segmentation for different product *variants* might occur. Research demonstrates no difference between Coke and Pepsi buyers, but there might be a difference between diet and regular soft-drinks buyers. The underlying reason is that, unlike competitive brands, which compete on a similar range of products, product variants are really functionally different. Therefore, they may appeal to a distinct customer base. Unfortunately, little systematic is yet known about the segmentation of product variants.

This thesis therefore will address that issue by examining variant-based segmentation across a range of brands in different categories. The thesis not only aims at identifying different buyer groups, but whether they correspond to identifying demographic variables such as age, employment status and so on. A finding of segmentation among product variants may help marketing managers target buyers more effectively and efficiently.

1.3 Significance of the Thesis and the Research Questions

While prior work has shown that there is little or no brand segmentation because marketers might have responded to competitive efforts as categories develop more variants, research on variant - based segmentation seems to be a more realistic and useful way of segmentation. However, there has been very limited investigation to this issue.

Several studies have applied the Negative Binomial Distribution (NBD) Dirichlet model to SKU-based variants (Kennedy and Singh, 2002; Singh *et al.*, 2008, and Singh *et al.,* 2004). The NBD Dirichlet model is a model for the patterns of repeat purchases of different brands within a category. It offers a robust method to predict buyer behavior for competing brands (Ehrenberg *et al.*, 2004). They found that the model fits well to product variants. This indicates that there might be a lack of variant-based segmentation. The reason is that the NBD Dirichlet is for a market that is un-segmented (Ehrenberg *et al.,* 1990, Ehrenberg, 1988). If market segments exist, the model would not describe buyer behaviour very well (Ehrenberg *et al.,* 1990).

However, Bock (1999) has argued that the assumption that the market is un-segmented is not essential to the NBD-Dirichlet model. It is still possible to segment the market that has been described as Dirichlet type. The reason is that it is possible to group buyers who have steady personal purchasing rates for brand and product variant to different segments. Yet, there is very little evidence of segmentation in markets that have been described as Dirichlet-type. As such, a finding on whether or not product variants are segmented could shed more light on this issue.

Only a few studies have endeavoured to develop market segmentation at the product variant level. Two studies (Grover and Srinivasan, 1987; Rao and Sabavala, 1981) have proposed market segmentation methodologies for brands and product variants and shown some indications that there is different segments for product variants. However, the segments identified in these studies were latent segments and not characterized in terms of consumer descriptors such as demographic and psychographic variables. In other words, there are some consumers who have a

tendency towards buying a particular variant, but whether or not they can be identified by their characteristics is not known. In addition, since these studies have typically only examined one category to illustrate the segmentation technique, the findings have not been generalisable to other categories in the marketing literature.

In summary, there are few studies that have reported whether or not different SKU-based variants appeal to *identifiably* different groups of customers. Empirical studies encompassing multiple product categories are needed to advance the knowledge base pertaining to product variants.

Thus, the research questions of this thesis are:

1. Do product variants appeal to different segments of buyers within a category?

2. What are segment similarities across categories?

1.4 Research Method and Data

This thesis applies the cross-tabular analysis method for segmentation of product variants. Cross-tabular analysis has long been used in market segmentation research and appears to be the most popular method for evaluating segmentation variables (Wedel and Kamakura, 2000; Weinstein, 1994). The advantages of this method are that it enables the researcher to quickly gain insights about segments and the associations between variables and it can discover the non-linear relationships between variables (Wedel and Kamakura, 2000).

In order to address the research question, this study aims to compare the *market share* of product variants across different groups of buyers to determine the extent to which different variants appeal to different customer bases. For example, what is the market share of 'diet' drinks among younger buyers compared to older buyers? As suggested by previous literature, market share can be viewed as purchase probability (e.g. Cooper and Nakanishi, 1988; Ehrenberg, 1988; Fader and Schmittlein, 1993; Jarvis *et al.*, 2006; Grover and Srinivasan, 1987). In this thesis, market share equals to aggregate level of purchase propensity, it presents the probability of buying a product variant, conditional on membership in a specific demographic group. For example, if the market share for a product variant is 50 percent within a demographic group, this can be interpreted that this group purchases the variant with a 0.5 probability. It does not mean that every individual within this group buy the variant with a 0.5 probability. As argued by (Bass *et al.*, 1968), comparing the conditional probabilities between different groups of buyers is essential in any market segmentation study. The advantage of measuring market share is that it controls for differential buying propensities towards the category by capturing both penetration and purchase frequency (Huang and Dawes 2006). The outcomes are particularly clear if the variant has same share in all demographics, or not.

The purpose of this thesis is not only to identify if different product variants appeal to different groups of customers, but also to identify the magnitude of the differences. This is done by comparing the highest share (Max) of each variant to the lowest share (Min) of that variant across different demographic groups. If large differences in market shares are found across different demographic groups, this

indicates there are market segments for product variants. An example is shown shortly.

The comparison will be taken in both absolute and relative forms. In other words, the deviation is calculated between Max and Min (Max-Min), and the ratio between Max and Min (Max/Min). This is because in the case of the low share variants, the absolute comparison might not detect the differences between different groups (Agresti, 2002). For example, if the Max share and Min share of a variant are 3 and 1 percent (respectively), the ratio between Max and Min (3 times difference) may be more noteworthy than the deviation between Max and Min (2 percentage points difference). If there is little or no difference among groups of buyers, the absolute deviations between different groups of buyers should be less than 5 percentage points (Hammond *et al.*, 1996; Kennedy *et al.*, 2000; Kennedy and Ehrenberg, 2001) and the ratio should be about 1.0 (Agresti, 2002). Therefore, the thesis will be looking for the deviations of 5 percentage points and above or the ratios of 1.1 or more. These benchmarks are used to identify notable differences in market share across demographics. Yet, the question of actionability based on these differences is left to the discussion section.

Table 1 shows an example of market share of product variants within different demographic groups. As we can see, the small pack size has 38% share of the purchases of the under 35 years age group, the medium pack size has 31% share, and so on. The columns under the age heading sum to 100. Looking across the rows, we see that while the small pack size has 38% share of the purchases of the under 35 years age group, it has only 15% share of the purchases of the 35-44 years age group, and so on.

Table 1. Example of product variant shares within different demographics

Soft drinks	Age						Deviation	Ratio
Pack-size	<35	35-44	45-64	65-74	Max	Min	(Max-Min)	(Max/Min)
Total	100	100	100	100				
Small	38	15	12	8	38	8	*30*	*4.8*
Medium	31	14	10	11	31	10	*21*	*3.1*
Large	25	56	57	61	61	25	*36*	*2.4*
Multi	6	16	21	20	21	6	*15*	*3.6*
Average							***26***	***3.5***

As we can see from the table above, the highest and lowest shares of the small pack-size variant are 38% within the under 35 group and 8% within the 65-74 group, respectively. As a result, the deviation (Max-Min) is 30 points and the ratio (Max/Min) is 4.8 for the small pack-size variant across the four age groups. On the other hand, the highest share of the large pack-size variant is 61%, which is in the 65-74 group, and the lowest share of that variant is 25%, which is in the under 35 group. Thus the deviation and the ratio for the large pack-size variant are 36 points and 2.4, respectively. The figures show large differences between the two groups. They are much greater than the target values of 5 points for Max-Min and 1.0 for Max/Min. They indicate that the probability of the small pack-size variant being bought within the under 35 group is 4.8 times higher than its purchase probability within the 65-74 group. In contrast, the probability of buying the large pack-size variant within the under 35 group is 2.4 times lower than the probability within the 65-74 group. Therefore, it can be concluded that the small and large pack-size variants appeal to different segments of buyers. The small pack-size variant appeals far more to young buyers whereas the large pack-size variant attracts older buyers. To summarise the differences, the averages of the deviations and of the ratios are calculated. This example shows that, on average, the difference between the highest and lowest shares of a pack-size variant across different age groups is 26 percentage points or 3.5 times

A range of different product variants were analysed in this thesis. They consist of form, pack-size, pack-type, and formula. For example, with the soft-drink category, the pack-size variants are small, medium, large and multi pack-sizes; the pack-type variants are can and bottle types; the formula variants are regular and diet drinks; the form/type variants are colas, fruit carbonate and lemonade drinks. The thesis covers nine grocery products from drink, food, and cleaning categories. These categories are listed below:

- Drink categories: Soft drinks, Instant coffee, Whisky.
- Food categories: Soup, Cooking sauces.
- Cleaning categories: Fabric care, Bleach and lavatory cleanser, Toothpaste, and Soap.

The data used in this thesis is household consumer data for a 12-month period from the Taylor Nelson Sofres (TNS) superpanel database. The panel consists of 15,000 telephone-owning households across the UK. The panel is drawn from only full-time residents. The sample is demographically and regionally balanced in order to represent the UK population (TNS, 2008). As such it represents a very large, valid and reliable data source.

The segmentation variables used in this thesis are age, employment status, social class, household size, and the presence or absence of children in the household. As suggested by several authors (Fennell *et al.*, 2003; Kalyanam and Putler, 1997; Rossiter, 1985), general descriptors such as demographic variables may be useful bases for segmentation for different product variants. The reason is that different product variants might cater the needs of different demographic groups. For example, larger households with children might buy more large pack-sizes than smaller households without children. Employed and higher social class buyers might purchase more expensive variants (e.g. premium soup) than unemployed and lower social class buyers. Older buyers might purchase more diet variants because they might be more concerned about their health.

1.5 Main Findings

Overall, the findings show that there are many differences in market shares of product variants among different demographic groups of buyers. The largest differences are found within the age and employment status variables. The overall deviations and ratios for these variables are much greater than the target values of 5 points for Max - Min and 1.0 for Max/Min (8 and 2.2 for the age variable; 10 and 2.2 for the employment status variable, respectively). The results indicate that market segmentation for different product variants does occur. Moreover, the differences are quite substantial. Functionally different product variants tend to draw different demographic based segments of buyers.

The findings also show that there are segment similarities across multiple product categories. These similarities are:

- For the food and drink categories, the healthy variants such as diet drinks, decaffeinated instant coffee, and premium soup appeal more to an older buyer segment. In contrast, the regular or standard variants appeal to a younger aged segment.

- For the cleaning categories, the 'traditional' variants such as normal tube-type toothpaste, non-scented bleach and lavatory cleanser, regular soap, and non-automatic fabric care appeal more to older buyers whereas the 'new' variants such as stand up tube-type toothpaste, scented bleach and lavatory cleanser, moisturising and sensitive soap, and automatic fabric care appeal more to younger buyers.

The results show that there is a weak association between household size and pack-size buying. In five categories, household size alone cannot explain the buying behavior for different pack-sizes. This might be explained by the reason that some large households might contain small children, thus these households might buy both small and large pack-size variants for different individuals within the household.

However, the findings show that there is a strong association between pack-size buying and age. For the drink categories such as whisky and soft-drinks the large

size variants appeal more to the older group while the small size variants appeal more to the younger group. By contrast, for the food categories, small size variants appeal more to older buyers while large size variants appeal more to younger buyers. There are mixed results among the cleaning categories. The small size variants appeal more to older buyers in the toothpaste and fabric care categories, but to younger buyers in the bleach and lavatory cleanser and soap categories. This suggests that pack-size buying associates more with characteristics of *individuals* within the household (e.g. age of the principle shopper) than characteristics of the *entire* household (e.g. household size). The results also suggest that market segmentation for pack-sizes might be category specific. For example, for some products such as whisky variants, they can be stored a long period after the first use. But, for others such as soup variants, they are not storable. As a result, older buyers might buy large pack-size whisky variant for repeated use but small soup variant for one use only. Therefore, brand managers have to look at each category to see what the usage segments are.

The results also indicate that the employment status variable is an important measure for market segmentation of product variants. Different employment status groups tend to buy different product variants. This could be explained by the reason that employment status is associated with income. People with less income might buy different variants compared to those with higher income. For example, more expensive variants (e.g. tablet-type fabric cares) appeal more to employed buyers while cheaper variants (e.g. powder-type fabric cares) appeal more to unemployed buyers. As such, it is necessary to take in to account the differences in consumer affordability across various segments in developing and marketing product variants.

Although the findings of this thesis show that there are strong associations between buyers' demographic characteristics and product variants buying, it is not evident that a particular demographic group buys only a specific product variant. For example, lemonade soft-drinks have much higher share among older age groups, but this does not mean that all older people drink this product variant. This is an important point because in order to target a demographic group more efficiently, it is needed to further examine other factors that could explain their choice of a particular variant. This could be related to consumer needs and wants, attitudes and behavior,

and buying situation etc. Without obtaining adequate information about consumers, it is difficult to target consumers effectively. Usage occasion or situation is a promising variable for inclusion in such examination. The reason is that a buyer might purchase different product variants according to different occasions (e.g. a house wife might buy a large pack of soup for family meal but a small pack for her lunch at work). Incorporating this type of variable with demographics will help marketers produce more useful segmentation results.

1.6 Limitations and Future Research

This thesis has several limitations that need to be addressed. First, the input data for the analysis is household data, not individual data. Because a household might contain individuals who have different needs, a market segmentation analysis at the household level might reduce the chance to reveal segments. Therefore, there might be more segmentation than discovered. For example, a household might include children and older adults. Then if the principal shopper purchases soft drinks, she might buy lemonade for herself and colas for the children. As such, an analysis at the household level might mask the difference between individuals within the household.

Second, the thesis only investigates the consumer demographic characteristics whereas market segmentation can be classified in many other different ways such as psychographic, behaviour, purchase occasion and benefit. Unfortunately, the current data set does not cover these variables. In addition, the scope of this thesis is to examine multiple product categories whereas some of these variables (e.g. purchase occasion and benefit) are product category specific, which is rather limited for such a multiple category study. Future research could extend to investigate these variables where it is applicable or within a specific category. For example future research could investigate which benefits that different soup variants, such as premium, fresh and thick diced, offer and relate them to consumer demographic characteristics. Knowing which variables associate with product variant buying will help marketers target consumers more efficiently.

Third, this research has been limited to the analysis of a single independent variable at a time. Although this kind of analysis might help to identify the variables that associate with choices of product variants, extended analysis to incorporate two or more variables at a time might produce deeper understanding of market segmentation for product variants. For example, future research could examine the combination effect of the age and employment status variables on product variant buying, given that these variables are good bases for market segmentation of product variants. We know that younger consumers tend to buy more 'new' variants than older consumers. These 'new' variants could be more expensive than the 'traditional' ones (e.g. tablet-

type fabric care is more expensive than powder-type one). On the other hand, we also know that unemployed consumers tend to buy cheaper variants. An interesting question arisen here is which variant appeals to *unemployed younger* consumers. Does this combination demographic group still buy more 'new' variants? This question can be answer by using more sophisticated market segmentation techniques, but it is out of the scope of this thesis

Fourth, this thesis only looks at one variant at a time. In the reality, consumers actually buy a combination of variants (e.g. a small bottle of diet Coke). Future research could extend to examine market segmentation for multi-dimensional variants. For example, we know that diet formula and lemonade soft-drink variants appeal to older buyers while regular formula and colas variants appeal to younger buyers. But we do not know if *diet colas* variants appeal to younger or older buyers. Only future research can confirm this. This type of research will help us identify the effect of combinations of variants on buyer behaviors and the associations with buyers' characteristics at this complex level. Unfortunately, such an analysis is not within the scope of this thesis because it starts to get category specific findings and diminishes the opportunity for generalised findings.

Finally, this thesis has been limited to the consumer-packaged goods (FMCG) in the UK. Future research could extend to different countries or different industries such as service and durable goods. For example, we know that blended whisky appeals more to older UK consumers whereas rye and bourbon whiskies appeal more to younger UK consumers. But whether or not this pattern hold in the USA, given that most of rye and bourbon whiskies are produced in here. Similarly, we know that 'new' FMCG variants appeal more to younger consumers but whether or not a new car variant also appeals to this demographic group is not known. Only future research can help us broaden our knowledge of market segmentation for product variants as well as provide empirical generalisations on this important topic.

1.7 Thesis Organization

This thesis is organised into five chapters namely Introduction, Literature review, Research method and data, Results and discussion, and Implication, limitation and future research. The brief contents of each chapter are shown below:

Chapter 1 - Introduction

- Outline the central theory, the research questions, the research method, the main findings and limitations of the thesis.

Chapter 2 – Literature Review

- Review the market segmentation literature.
- Discuss the usefulness of demographic variables for market segmentation
- Discuss the extent of brand level segmentation
- Review the consumer behaviour for product variants and the limited literature on variant-based segmentation.

Chapter 3 – Research Method and Data

- Detail the research method used in the thesis.
- Specify the data used in the thesis.

Chapter 4 – Results and Discussion

- Detail findings of the thesis.
- Discuss the results of the thesis.

Chapter 5 – Implications, Limitations and Future Research

- Discuss implications of the findings for theory and practice.
- Show the limitations of the thesis.

- Suggest future research directions.
- Summarise the contributions of the thesis.

1.8 Definitions

Below are definitions of the terms used in the thesis.

- Brand – The name of the products of one seller or manufacturer to differentiate from competitors' products such as Coke and Pepsi. In this thesis brands are compared within categories.

- Buyers – Households who have made a purchase in the category in a given period.

- Category – A set of similar products that fulfils the same consumer needs, for example the soup category might contain dried, condensed and regular versions of different flavours and brands of soup.

- Conditional purchase probability – The probability of buying a product variant, conditional on membership in a specific demographic group.

- Demographic group – A group of buyers that has similar demographic or socioeconomic characteristics such as under 35 year age group, unemployed group, and retired group.

- Deviation – (Max share – Min share).

- Market share (of a specific variant) – Total numbers of purchases of a product variant (numbers of times the variant is bought) divided by total numbers of purchases of the category in a given period.

- Max share – The highest market share of a product variant across demographic groups. For example, the lemonade soft-drink variant had the highest market share among over 64 year olds.

- Min share –The lowest market share of a product variant across demographic groups. For example, the lemonade soft-drink variant had the lowest market share among under 35 year olds.

- Penetration – The proportion of the buyers buying a product at least once in a given period.

- Product variants – Functionally different SKU-based variants such as small and large pack-sizes; regular and diet soft-drinks, colas and lemonade. In this thesis, the product variants are examined at the category level, not brand level. For example, both diet Pepsi and diet Coke are classified as the same diet variant within the soft-drink category.

- Purchase frequency – Numbers of purchases per buyer in a given period

- Ratio – Max share / Min share.

- Shoppers – All potential buyers in the category.

- SKU – Stock Keeping Unit. This is an individual product within a category such as a can of 350ml diet colas Coke.

Chapter 2 Literature Review

2.1 Chapter Introduction

This chapter reviews the market segmentation literature. It canvasses the usefulness of demographic variables for market segmentation at three levels namely category, brand and product variant. The chapter also incorporates the importance of SKU-based product variant in marketing research, and reviews the limited literature on variant-based segmentation.

2.2 Market segmentation

Market segmentation has been described as a core marketing strategy concept (Dibb and Simkin, 2008; Dickson and Ginter, 1987; Frank *et al.*, 1972; McDonald and Dunbar, 1998; Smith, 1956; Wedel and Kamakura, 2000; Weinstein, 1994; Wind, 1978). Smith (1956, p.6) defined it as "*viewing a heterogeneous market (one characterized by divergent demand) as a number of smaller homogeneous markets in response to differing product preferences among important market segments. It is attributable to the desires of consumers or users for more precise satisfaction of their varying wants*". The potential benefits of market segmentation are that it helps organizations maximize resources, gain competitive advantages and target consumers more effectively and efficiently (Dibb and Simkin, 2008).

Since the introductory article on market segmentation by Smith (1956), an extensive body of literature (e.g. Assael, 1970; Green and Tull, 1974; Green *et al.*, 1976; Myers and Tauber, 1977; Green and DeSarbo, 1979; Wildt and McCann, 1980; Grover and Srinivasan, 1987; Kamakura and Russell, 1989; Wedel and Kamakura, 2000) has concentrated on developing market segmentation techniques. However, far less attention has been paid to the generalisability of market segmentation findings. In other words, the principal focus has been to develop advanced techniques and demonstrate their usefulness for a specific product category. Whether that particular approach would yield generalisable results to other categories has rarely been examined. There are some notable exceptions, which are discussed subsequently.

Not all marketing scholars believe in the pre-eminence of market segmentation and targeting. Wright and Esslemont (1994) argued that targeting a specific market segment does not always imply the best overall market response. According to the authors, no evidence has demonstrated market segmentation and targeting as inherently superior to other marketing approaches. They argued that it is still possible that a mass marketing approach could bring a better overall market response (Wright and Esslemont, 1994).

Furthermore, Hoek *et al.* (1996) questioned the belief that market segmentation necessarily leads to better marketing decisions. The authors argued that market segmentation involves arbitrary decisions in the sense that marketing researchers do

not appear to agree on the most appropriate variable and method for market segmentation in a given situation. As a result, market segmentation outcomes are not robust or stable (Hoek *et al.,* 1996).

However, there is little evidence of the use of the mass marketing approach in practice. The potential problems of this approach are that the organisation might fail to meet customer needs and wants and that there might be a lack of appeal because the marketing programs will be too broad (Dibb and Simkin 2008).

In summary, market segmentation is based on the idea that consumers are heterogeneous in needs, wants, preferences or other market-related behaviour. This is certainly not a controversial idea. But, the challenges for segmentation research have been to identify if and how this heterogeneity in behaviour maps onto brand or product choice, and if the method provides identifiable means of locating segments.

2.3 The usefulness of demographics as market segmentation variables

Market segmentation can be classified in many different ways. The common bases for market segmentation include geographic, demographic, psychographic, behaviour, purchase occasion and benefit segmentation (Beane and Ennis 1987; Frank *et al.*, 1972). Each of these variables has its advantages and limitations, hence, there is no one correct variable to divide markets (Beane and Ennis, 1987; Dibb and Simkim, 2008; Struhl 1992; Weinstein, 1994).

Among these segmentation variables, demographics such as gender, age, and income appear to be popular bases to distinguish customer groups because they are easy to measure, easy to access, and form a basis for implementing marketing strategy (Franky *et al.*, 1972; Wedel and Kamakura, 2000; Weinstein, 1994). According to Wedel and Kamakura (2000), demographics are identifiable, substantial, accessible and stable. Therefore, demographic variables continue to be used in both simple and complex segmentation studies, as well as to increase the accessibility of segments formed by other bases (Wedel and Kamakura, 2000).

However, the usefulness of demographic variables for market segmentation has been disputed in the marketing literature over a considerable time period. It also depends on the market segmentation levels (category, brand, and product variants), which are discussed in the next sections.

2.4 Market segmentation at the category level

At the category level, Frank *et al.*, (1967) concluded that demographic variables are poor indicators for market segmentation. In their multiple regression analysis of 14 demographic variables repeated for each of 57 product categories, they found that most of the adjusted R^2 are less than 0.20 and the highest adjusted R^2 is 0.29 (Frank *et al.*, 1967). In other words, demographics do not discriminate well between people who buy or do not buy particular categories.

In contrast, Bass *et al.* (1968) and Utsey and Cook (1984) stated that demographic variables *are* good indicators for market segmentation at the category level. The authors argued that the regression analysis method in the studies of Frank and his colleagues was focused on individual behaviour, which resulted in misleading interpretations because market segmentation should be based on characteristics of groups of buyers, not individuals (Bass *et al.*, 1968; Utsey and Cook, 1984). The authors show that using simple cross-classification analysis that focuses on *group* behaviour produces significant relationships between household demographic characteristics and buying behaviour for different product categories (see Table 2, significant at the .05 level or less).

Table 2. Significant (S) and non-significant (NS) contingency tables of amounts purchased for each product and socio-economic measurements

Product	Age	Children	Income	Education	Occupation	T.V. viewing
Catsup	S	S	S	S	S	S
Frozen orange juice	S	S	S	S	S	S
Pancake or waffle mix	NS	S	S	S	S	NS
Candy bars	S	S	S	S	S	NS
Cake mix	S	S	S	NS	NS	NS
Beer	S	S	S	NS	NS	S
Cream shampoo	NS	S	NS	NS	NS	NS
Hair spray	S	S	S	S	S	NS
Toothpaste	S	S	S	S	S	S
Mouthwash	S	S	NS	S	S	NS

Source: Bass *et al.* (1968, p. 268)

2.5 Market segmentation at the brand level

Going beyond the product category level studies cited above, numerous studies have considered the identification of market segments that correspond to preferences for particular *brands*. However, much of the focus of this effort has been methodological. Examples are Assael (1970); Green and Tull (1974); Green *et al.* (1976); Myers and Tauber (1977); Green and DeSarbo (1979); Wildt and McCann (1980); Grover and Srinivasan (1987); Kamakura and Russell (1989); Wedel and Kamakura (2000). For instance, Grover and Srinivasan (1987) have used the maximum likelihood method for estimating latent class models to examine market segmentation for competing brands. Kamakura and Russell (1989) have proposed a probabilistic choice model that attempts to aggregate households into preference segments for competing brands and different price tiers. Although some market segmentation for competing brands have been found in these studies, less attention has been devoted to looking for generalisable findings that hold across product categories. Studies that *have* looked across multiple categories have generally found weak or non-existent brand level segmentation. These findings are now discussed.

In an early search for 'brand-by-brand' segmentation, Collins (1971) examined the extent to which a given brand was popular among buyers, and among non-buyers, of another competing brand. He found that any particular brand was approximately as popular among buyers of a specific competing brand, as much as non-buyers of that same competing brand (see Table 3).

Table 3. Penetration of brands A-D (%)

Brand	Penetration among buyers of brand E	Penetration among non-buyers of brand E
A	70	80
B	33	41
C	22	22
D	20	17
Average	36	40

Source: Collins (1971, p.154)

Collins (1971, p.156), therefore, argued "*there is little segmentation in the sense of one brand appealing to one segment of consumers and another brand appealing to*

another segment". Although Collins (1971) did not research brand segmentation in terms of buyer descriptors, his findings point out the weakness of market segmentation at the brand level.

Beyond Collins's study, Hammond *et al.* (1996) carried out a systematic analysis of buyer characteristics (mainly demographic) of competitive brands across 23 grocery categories in four different countries. The authors measured the mean absolute deviation (MAD) of each brand's user profile from the average user profile to identify the extent of brand segmentation. They found that MADs are around three percentage points for different demographic groups using each brand in a category. Thus, the authors claimed that there is generally no strong market segmentation between the competitive brands (Hammond *et al.*, 1996). Although the MAD method is straightforward, one possible shortcoming of this approach is that the mean does not show the distribution of individual deviations. As such, it might overlook some large differences between two brands (Dawes, 2006).

Extending Hammond *et al.* (1996)'s work to more categories and segmentation bases, Kennedy *et al.* (2000) conducted an extensive study on user demographic, media, and attitudinal profiles of competitive brands across 42 industries in the UK. The authors found similar results: MADs overall of only two to three percentage points between each brand's user profile and the average user profile. This suggests there is little or no difference between brand user profiles. Similar findings have also been found in the retail industry, that is, on average, user profiles of competitive retailers hardly differ in demographic, attitude and media characteristics - most of the MAD's average around one or two percentage points (Kennedy and Ehrenberg, 2001). These extensive and generalised findings show strong evidence against market segmentation for competitive brands.

Fennell *et al.* (2003) investigated the issue of using demographics and general psychographics as market segmentation variables for competitive brands across 52 product categories of non-durable packaged goods. The authors employed a latent variable model to examine the relationship between five different sets of covariates (demographics, self-concept, buying style, attitudes, and opinions) and brand preference. By comparing the estimates of the constrained multivariate model with isolated binomial models, the authors reported no useful associations between

demographic and general psychographic variables and brand preference. As a result, they argued that these variables are not specific enough in predicting brand choice. Indeed, they concluded that occasion or situation variables are more appropriate than demographics and psychographics in explaining brand preference (Fennell *et al.*, 2003, see also Yang *et al.*, 2002).

There is a further methodological issue worth noting concerning the approach of comparing brand user profiles to identify segments. The user profile of each brand is based on buyers who have purchased once or more in a time period such as a year. This may not fully reflect the extent to which brands differ in popularity among demographic groups (Huang and Dawes, 2006). The reason is that this type of analysis does not consider the weight of purchase for the brand. A particular brand may have similar penetration levels to competitors in a specific demographic group, but may be bought more heavily than the other brand by members of that demographic group. Such a purchase weight effect would be missed in an examination of user profiles. For this reason, Huang and Dawes (2006) proposed using the *market share* of each brand within specified demographic groups as the basis for analysis. The brand's share of purchases in a demographic group reflects both number of buyers and their purchase weight.

The following example illustrates the difference between measuring penetration and market share (Table 4). Supposed brand A and brand B have the same number of buyers but different purchase frequencies within two different demographics X and Y. This, as a result, generates the differences in market shares of the two brands between different demographic groups.

Table 4. Penetration, purchase frequency and market share of two brands within different demographics.

Brand	Penetration within demographic X	Penetration within demographic Y	Purchase frequency within demographic X	Purchase frequency within demographic Y	Share within demographic X	Share within demographic Y
A	50%	50%	2	2	27.3%	66.6%
B	50%	50%	5	1	72.7%	33.3%

Recently, Dawes (2006) and Huang and Dawes (2006) found evidence of only very mild segmentation for competing brands using general demographic variables. Dawes (2006) found that one brand over-performed within one demographic group

while the other under-performed within another group in the breakfast cereal category. Furthermore, in an analysis of four grocery categories, Huang and Dawes (2006) reported that cheap brands and expensive brands have differential appeals among certain demographic groups, but the absolute differences were not large (Huang and Dawes, 2006).

In summary, some very extensive analyses across multiple product categories have shown little in the way of brands mapping onto specific demographic groups.

2.6 Market segmentation at the product variant level

Despite the lack of evidence of market segmentation for competitive brands as shown in recent research, market segmentation for different product variants might occur. The underlying reason is that, unlike brands in the same category, which are arguably often substitutable in a functional sense, product variants are really functionally different, thus they might appeal to a particular customer base.

2.6.1 The importance of SKU-based product variants in marketing research

Fader and Hardie (1996) argued that the SKU (stock keeping unit) is a better unit of analysis than brand for most choice models using scanner data, because the final choice among customers in most cases is an SKU, not only a brand. However, modelling the choice of individual SKU's seems infeasible because each category usually contains a very large number of SKUs (Fader and Hardie, 1996). In order to overcome this, the authors proposed a choice model based on SKU attributes (e.g small and large pack-sizes, liquid and sheets) rather than each individual SKU (Fader and Hardie, 1996).

Furthermore, Andrews and Manrai (1999) argued that the product attribute level such as pack-size, formula, type and form is more appropriate than using individual SKU's in analysing consumer preference. The reason is that it is difficult for consumers to maintain well-defined preferences for each SKU over hundreds of SKUs in each category (Andrews and Manrai, 1999). Therefore, instead of establishing preference for each SKU, consumers might form preferences for the attributes that make up that SKU (Andrews and Manrai, 1999).

Recognising the importance of SKU based variants, a number of attempts have been made to determine consumer preference among different product variants. These have primarily had the objective of examining loyalty to product variants (Ehrenberg and Goodhardt, 1970; Jarvis *et al.*, 2007; Singh *et al.*, 2004; Singh *et al.*, 2008) and modelling the drivers of choice among variants (Guadagni and Little, 1983; Fader and Hardie, 1996; Kim *et al.*, 2002; Ho and Chong, 2003; Bell *et al.*, 2005;

Chintagunta and Dube, 2005; Singh *et al.*, 2005). Yet, not many studies have examined demographic-based segmentation at the product variant level.

2.6.2 Market segmentation at the product variant level

While findings show that there is little or no segmentation for competing brands because marketers might have responded to competitive efforts as categories develop more variants, research on variants- based segmentation seems to be a more realistic and useful way of understanding segmentation. However, very limited research has been conducted on this issue.

Several studies have examined whether or not buyers are loyal to functional distinctive product variants. For example, Kennedy and Singh (2002), Singh *et al.* (2008), Singh *et al.* (2004), and Ehrenberg and Goodhardt (1970) used the well-established Negative Binomial Distribution (NBD) Dirichlet model to examine loyalty to SKU-based variants. The NBD Dirichlet model is a model for the patterns of repeat purchases of different brands within a category. It offers a robust method to predict buyer behavior for competing brands (Ehrenberg *et al.*, 2004). They found that the model fits well to product variants. This indicates that there might be a lack of variant-based segmentation. The reason is that the NBD Dirichlet is for a market that is un-segmented (Ehrenberg *et al.,* 1990, Ehrenberg, 1988). The buyers of competing brands or product variants cannot be segmented on the brand or product variant they buy (Ehrenberg, 1988). They have steady personal purchase propensities (stochastic probabilities) for buying the brand or product variant over time (Goodhardt *et al.,* 1984, Singh *et al.,* 2008). If there is any segmentation, deviations between the model's predictions and the actual data will show up (Ehrenberg *et al.,* 1990).

Yet, Bock (1999, p.1) argued that "*the assumption that markets are unsegmented is, however, neither a theoretical nor a practical requirement for accurately describing a market using the Dirichlet distribution*". The reason is that it is still possible to group buyers who have steady personal purchasing rates for brand and product variant to different segments (Bock, 1999). However, there is very little evidence of segmentation in markets that have been described as Dirichlet-type.

Using a different method, Jarvis *et al.* (2007) conducted a study on loyalty for product attributes in the wine category. Measuring polarisation as a loyalty indicator, the authors reported that there is higher loyalty towards product attributes rather than brand (Jarvis *et al.,* 2007). Polarisation is a transformation of the loyalty estimate S from the Dirichlet Multinomial Distribution model. It varies from 0 to 1, the bigger the polarisation, the higher the loyalty (Jarvis *et al.,* 2007). In their study, the authors found that while the polarisation for the brand attribute is 0.160, the polarisations for other product attributes vary from 0.271 to 0.371 (Jarvis *et al.,* 2007). If product variants are more important than the brand in terms of consumer loyalty, there might be more market segmentation at the variant level rather than at the brand level.

When household characteristics are incorporated to the studies on preference to different product variants, there have been contradictory findings. For example, some authors (e.g. Singh *et al.,* 2008; Singh *et al.,* 2005) reported demographics explain little of the variation in product variants preferences. In contrast, other authors (e.g. Dube, 2004; Kalyanam and Putler 1997) concluded demographics play a significant role in determining differences in preferences for product variants. This suggests demographic-based segments for variants might exist, but these later studies did not actually identify segments.

Only a few studies have endeavoured to identify segments of buyers for different product variants. Studies such as Rao and Sabavala (1981) and Grover and Srinivasan (1987) have proposed market segmentation methodologies for brands and product variants and shown some indications that there are different segments for product variants. Rao and Sabavala (1981) have proposed a methodology for inferring a consumer's hierarchical choice process, which attempts to segment markets based on the level of variants in the hierarchy. The authors found that within the soft drinks category, the diet/non-diet variants are more important for the low purchase frequency segment than for the high purchase frequency segment, and the brand name variants appear to be used more than diet/nondiet variants in the high loyalty segment.

Grover and Srinivasan (1987) have shown empirical evidence of segmentation for coffee variants by using the relative purchase frequency as the basis for

segmentation. Four 'segments' were found in their study including Caffeinated regular, Decaffeinated regular, Taster's Choice, and Nescafe.

However, the segments identified in these studies were not characterized in terms of consumer descriptors such as demographic and psychographic variables. Although such segments are useful for understanding market structure, they do not meet the criteria of accessibility as described in the market segmentation literature (Wedel and Kamakura, 2000), because it is difficult for marketers to implement marketing strategies towards these segments. In addition, since these studies have only examined one category to illustrate the segmentation techniques, the findings have not been generalisable to other categories in the marketing literature.

In summary, there are some indications of market segmentation at the product variant level in the sense that there are some consumers who have a tendency towards buying a particular variant. But, whether or not they can be identified by their characteristics is not known.

2.7 Chapter Conclusion

This chapter reviewed the key theories and findings relating to market segmentation for brands and product variants, specifically on demographic variables. As it demonstrates, there are few studies that have reported whether or not different SKU-based variants appeal to identifiably different groups of customers. Empirical studies encompassing a broad context are needed to advance the knowledge base pertaining to product variants. The research questions posed here are:

1. **Do product variants appeal to different segments of buyers?**

2. **What are segment similarities across categories?**

Chapter 3 Research Method and Data

3.1 Chapter Introduction

This chapter presents the method chosen for analysing data in the thesis. It also provides details of the product variants analysed; details of the segmentation variables; and the data used in the thesis. An example of data analysis is supplied in this chapter so that the readers will have a clear picture of the analysis method.

3.2 Analysis Method

This thesis tabulates *product variant share x demographics* to examine if different variants appeal to different demographic groups of buyers. Cross-tabular analysis has long been used in market segmentation research and appears to be the most popular method for evaluating segmentation variables (Wedel and Kamakura, 2000). For example, marketing scholars have used cross-tabular analysis for product category level segmentation (e.g. Bass *et al.,* 1968; Utsey and Cook, 1984), and brand level segmentation (e.g. Dawes, 2006; Huang and Dawes, 2006). The advantages of this method are that it enables one to quickly gain insights about segments and the associations between variables and it can discover non-linear relationships between variables (Wedel and Kamakura, 2000).

Market share is the key measurement in this thesis. The market share of each variant can be seen as the conditional probability of choosing that variant (Cooper and Nakanishi, 1988; Ehrenberg, 1988; Fader and Schmittlein, 1993; Jarvis *et al.,* 2006; Grover and Srinivasan, 1987). In this thesis market share equals to aggregate level of purchase propensity. For example, if the market share for a product variant is 50 percent within a demographic group, this can be interpreted that this group purchases the variant with a 0.5 probability. It does not mean that every individual within this group buy the variant with a 0.5 probability. The advantage of measuring market share is that it controls for differential buying propensities towards the category by capturing both penetration and purchase frequency (Huang and Dawes 2006). As mentioned earlier, several market segmentation studies have examined user profiles of competing brands and found few differences (Hammond *et al.*, 1996; Kennedy *et al.*, 2000; Kennedy and Ehrenberg, 2001). But, even if user profiles are similar between demographic groups, purchase frequency might generate a difference in market share between the demographic groups. An example is shown below (Section 3.6).

The purpose of this thesis is not only to identify if different product variants appeal to different groups of customers, but also to identify the magnitude of the differences. This is done by comparing the highest share (Max) of each variant to the lowest share (Min) of that variant across different demographic groups. If large

differences in market shares are found across different demographic groups, this indicates there are market segments for product variants.

Hammond et al. (1996) and Kennedy et al. (2000) suggested that large deviations from an average are those above 5 percentage points. But, Dawes (2006) argued that we should look for deviations between the lowest and highest proportions because the deviations from an average are not able to highlight the strengths and weaknesses of a brand compared to another brand, which is more relevant to brand manager's perspective.

Another way to look for variations is using ratio of proportions. The advantage of using ratio is that it enable to detect the difference between two small proportions (Agresti, 2002). For example, if the Max share and Min share of a variant are 3 and 1 percent (respectively), the ratio between Max and Min (3 times difference) may be more noteworthy than the deviation between Max and Min (2 percentage points difference). A ratio of 1.0 corresponds to independence but it does not necessary imply statistical or managerial significance. Therefore, the thesis will be looking for the deviations of 5 percentage points and above or the ratios of 1.1 or more. The thesis uses the benchmarks just to detect notable differences between two proportions. Whether or not these differences are managerial significant is left for the dicusssion section.

3.3 Detail of product variants

Details of the product variants analysed in this thesis are shown in Table 5. The thesis covers product variants in nine product categories. These categories are: soft drinks, instant coffee, whisky, soup, cooking sauces, fabric care, bleach and lavatory cleanser, toothpaste, and soap. The product variants consist of pack-size, pack-type, formula, and product type. For example, with the soft-drink category, there are four pack-size variants (small, medium, large and multi); two pack-type variants (cans and bottles); two formula variants (regular and diet); and three product type variants (colas, fruit carbonate and lemonade).

The reason for choosing these categories is that they provide a variety of variants, each of which might draw different kinds of customers. For instance, small and large pack-size soup and cooking sauce variants that might attract different household sizes. Diet and regular soft-drink variants might appeal to different age groups. Premium and regular soup might appeal to different social classes. Tablet-type and powder-type fabric cares might attract different employment status buyers. In addition, these categories represent different types of products. Soft drinks, instant coffee, and whisky represent drink products; Soup and cooking sauces represent food products; Fabric care, toothpaste, soap, bleaches and lavatories cleansers represent cleaning products.

Table 5. Product variants in nine categories

Categories	Pack-size	Pack-type	Formula	Form/Type
1. Soft drinks	Small Medium Large Multi	Cans Bottles	Regular Diet	Colas Fruit Carbonates Lemonade
2. Instant Coffee	Small Medium Large Multi	Bottle Box Tin Packet	Decaffeinated Caffeinated	Freeze dried Granules Powder Cappuccino
3. Whisky	Small Medium Large		Blended/De Luxe Malt Bourbon/Rye/Other	Scotch Whisky American Whisky Irish Whisky
4. Soup	Small Medium Large	Can Tub Carton	Regular Low Calorie Premium Fresh Thick Diced	Condensed Standard
5. Cooking sauces	Small Medium Large	Jar Packet Bottles Tub		Condiment sauces Cook & pour over sauces Cooking additives Salsa sauces
6. Fabric care	Small Medium Large		Automatic Light Duty High Suds	Powder Liquid Tablet Capsule
7. Bleaches and lavatory cleansers	Small Standard Large		Scented Non-scented	
8. Toothpaste	Small Medium Large	Tube Pump Action Stand Up Tube		
9. Soap	Small Medium Large			Regular Moisturising Cleansing Sensitive

3.4 Segmentation variables

The potential segments analysed in this study are based on five demographic variables. These are age, employment status, social class, household size, and the presence or absence of children in the household (Table 6). The reasons for choosing these variables are that, as discussed earlier, they are identifiable, substantial, accessible and stable (Wedel and Kamakura, 2000). Past research has used these variables for market segmentation studies at the product category and brand levels and shown some positive results (e. g. *Age* (Bass *et al.,* 1968; Utsey and Cook, 1984); *Employment status* (Frank, 1967); *Social class* (Huang and Dawes, 2006); *Household size* (Dawes, 2006; Utsey and Cook, 1984); *The presence or absence of children in the household* (Bass *et al.,* 1968)). In addition, as suggested by several authors (Fennell *et al.*, 2003; Kalyanam and Putler, 1997; Rossiter, 1985), general descriptors such as demographic variables may be useful bases for segmentation for different product variants. The reason is that demographic variables are often correlated to product use. For example, seniors use more upper denture cleansers than young adults (Fennell *et al.,* 2003).

It seems realistic to look for possible segments with these demographic variables because different product variants might cater the needs of different demographic groups. For example, larger households might buy more large pack-sizes than smaller households because they consume more than smaller households. Employed buyers might purchase more expensive variants (e.g. premium and fresh soup; tablet fabric care) as they might have higher income than unemployed buyers. In contrast, cheaper variants (e.g. regular soup, powder-type fabric cares) might attract lower social class and un-employed buyers as these variants are more suitable with their affordability. Older buyers might purchase more diet variants because they might be more concerned about their health. Furthermore, as shown in practice, firms and media often use demographics as a basis for targeting consumers (Fennell and Allenby, 2004). For example, in retail marketing, demographics play a crucial role for understanding and targeting shoppers (Pooler, 2002).

Table 6. Segmentation variables

Household size	1 member household 2 member household 3+ member household
The presence or absence of children	Children presence Children absence
Age*	<35 years old 35-44 years old 45-64 years old 65-74 years old
Social class	Class AB Class C Class DE
Employment status*	Employed Unemployed Retired Student Not working

* Age and employment status of principle shopper.

3.5 Data

The thesis uses consumer panel data for a 12-month period provided by the Taylor Nelson Sofres (TNS). The panel consists of 15,000 telephone-owning households across the UK. The panel is drawn from only full-time residents. The sample is demographically and regionally balanced in order to represent the UK population. Data is collected from panel participants twice weekly via electronic terminals in the home, with purchases being recorded via home-scanning technology (TNS, 2008). The advantages of consumer panel data are that they record actual purchase behavior over a large sample. This provides empirical validity to the findings.

3.6 An Example of Data Analysis

The following example illustrates the analysis method undertaken in this thesis. Recall that Max is the highest share and Min is the lowest share of a variant across demographic groups.

Let **Deviation = Max - Min**

Let **Ratio = Max / Min**

Table 7. Shares of soft drinks variants within different age groups.

Soft drinks	Age						Deviation	Ratio
Pack-size	<35	35-44	45-64	65-74	Max	Min	(Max-Min)	(Max/Min)
Total	100	100	100	100				
Small	38	15	12	8	38	8	30	4.8
Medium	31	14	10	11	31	10	21	3.1
Large	25	56	57	61	61	25	36	2.4
Multi	6	16	21	20	21	6	15	3.6
Average							**26**	**3.5**

As can be seen from Table 7, the small pack size has 38% share of the purchases of the under 35 year old group, the medium pack size has 31% share, and so on. The columns under the age heading sum to 100. Looking across the rows, we see that while the small pack size has 38% share of the purchases of the under 35 year old group, it has only 15% share of the purchases of the 35-44 year old group, and so on. The highest and lowest shares of the small pack-size variant are 38% within the

under 35 group and 8% within the 65-74 group, respectively. As a result, the deviation (Max-Min) is 30 points and the ratio (Max/Min) is 4.8 for the small pack-size variant across the four age groups. On the other hand, the highest share of the large pack-size variant is 61%, which is in the 65-74 group, and the lowest share of that variant is 25%, which is in the under 35 group. Thus the deviation and the ratio for the large pack-size variant are 36 points and 2.4, respectively. The figures show large differences between the two groups. They are much greater than the target values of 5 points for Max-Min and 1.0 for Max/Min. They indicate that the probability of the small pack-size variant being bought within the under 35 group is 4.8 times higher than its purchase probability within the 65-74 group. In contrast, the probability of buying the large pack-size variant within the under 35 group is 2.4 times lower than the probability within the 65-74 group. Therefore, it can be concluded that the small and large pack-size variants appeal to different segments of buyers. The small pack-size variant appeals far more to young buyers whereas the large pack-size variant attracts older buyers. To summarise the differences, the averages of the deviations and of the ratios are calculated. This example shows that, on average, the difference between the highest and lowest shares of a pack-size variant across different age groups is 26 percentage points or 3.5 times.

3.7 Chapter Conclusion

This chapter shown in detail the analysis method and data used in the thesis. For the purpose of analysing a range of large categorical data sets in order to gain insights about segments and the associations between demographic characteristics and product variants, cross-tabular analysis seems to be appropriate and effective. In the example shown above, this method did identify quite noticeable segments for different product variants.

Chapter 4 Results and Discussion

4.1 Chapter Introduction

This chapter presents the findings for nine product categories that have been analysed using the method proposed in the previous chapter. First, the detailed results for each category are reported. Then, the overall results for all nine categories are summarised. In order to help look for patterns, the categories are ordered according to types of products. The first three categories are drink categories. The next two categories are food categories. And the last four categories are cleaning categories. The findings demonstrate that there are many differences in market shares of the product variants between different demographic groups. The largest differences are found within the age and employment status variables.

4.2 Detailed results for the soft drinks category

The following table shows in detail the results for the soft drinks category, which consists of formula, pack-size, pack-type and form/type variants. As can be seen from the table, most of the deviations are 5 points or more and most of the ratios are 1.1 or bigger. This demonstrates that there are noticeable differences among buyers for the various soft drink variants. The largest differences appear among the age and employment status variables. The averages of the deviations are 21 points and 26 points for the age and employment status variables, respectively, which are quite far from the 5 points target. The averages of ratios for these variables are also significantly bigger than 1.0 (2.4 and 3.8 respectively). The large differences between the highest and lowest shares pinpoint that the product variants do appeal to different groups of buyers.

More specifically, these differences are:

- For formula variants, the diet variant appeals more to middle aged buyers, the employed group, and the higher social class group. It has 45% and 46% shares within the middle aged group and the employed group (respectively), but only 26% and 20% within the under 35 year old group and the student group (respectively). In contrast, the regular variant appeals more to younger buyers, students and the lower social class group. It has 75% and 81% shares with the under 35 year old group and the student group (respectively), but only 55% within the middle aged group and the employed group.

- For pack-size variants, older buyers buy more large and multi pack-sizes: The large size variant has 61% share within the 65-74 year old group, but only 25% within the under 35 year old group. In contrast, younger buyers buy more small and medium pack-sizes: The small size variant has 38% share within the under 35 year old, but only 8% within the 65-74 year old group. Similar findings were also found within the employment status variable: The retired group buys more large and multi pack-sizes while the student group buys more small and medium pack-sizes.

- For pack-type variants, the bottle-type variant appeals more to older buyers. It has 83% share within the retired group but only 56% within the student group. In contrast, the can-type variant appeals more to younger buyers, and the student group. It has 44% share within the student group, but only 18% within the retired group.

- For type variants, the cola variant appeals more to younger buyers: It has 50% share within the under 35 years old group, but only 29% within the 65-74 year old group. In contrast, the lemonade variant appeals more to older buyers and the retired group. It has 30% share within the 65-74 year old group, but only 5% within the under 35 years old group.

Table 8. Shares of the soft drinks variants within demographic groups

Variables		HH size					Children				Age						Social Class					Employment Status						
Soft Drinks	Market Share	1	2	3+	Dev	Ratio	No	Pre	Dev	Ratio	<35	35-44	45-64	65-74	Dev	Ratio	AB	C	DE	Dev	Ratio	Emp	Un emp	Reti	Stu	Not work	Dev	Ratio
Formula																												
Regular	60	58	55	62	***7***	*1.1*	58	63	***5***	*1.1*	74	55	55	58	***19***	***1.3***	55	59	65	***10***	***1.2***	55	65	58	81	59	***26***	***1.5***
Diet	40	42	45	38	***7***	***1.2***	42	37	***5***	*1.1*	26	45	45	42	***19***	***1.7***	46	41	35	***10***	***1.3***	46	36	42	20	41	***26***	***2.3***
Average					***7***	*1.1*			***5***	*1.1*					***19***	***1.5***				***10***	***1.2***						***26***	***1.9***
Pack-size																												
Large	48	49	56	46	***10***	***1.2***	51	45	***6***	*1.1*	25	56	57	61	***36***	***2.4***	44	47	53	***9***	***1.2***	54	47	64	10	59	***54***	***6.4***
Small	19	23	16	20	***7***	***1.5***	18	21	*4*	***1.2***	38	15	12	8	***30***	***4.8***	17	20	19	2	*1.1*	15	24	8	44	12	***36***	***5.3***
Multi	16	15	17	15	2	*1.1*	18	13	***5***	***1.3***	6	16	21	20	***15***	***3.6***	21	16	14	***7***	***1.5***	19	12	16	4	20	***16***	***5.0***
Medium	17	13	12	19	***7***	***1.6***	13	21	***7***	***1.5***	31	14	10	11	***21***	***3.1***	18	18	14	***4***	***1.3***	12	17	12	42	9	***33***	***4.5***
Average					***6***	***1.3***			***5***	***1.3***					***26***	***3.5***				***6***	***1.3***						***34***	***5.3***
Pack-type																												
Bottles	73	68	76	72	***8***	*1.1*	73	73	*0*	*1.0*	61	77	76	82	***21***	***1.3***	72	72	74	2	*1.0*	74	71	83	56	78	***26***	***1.5***
Cans	27	32	24	28	***8***	***1.3***	27	28	*0*	*1.0*	39	23	24	19	***21***	***2.1***	28	28	26	2	*1.1*	26	29	18	44	22	***26***	***2.5***
Average					***8***	***1.2***			*0*	*1.0*					***21***	***1.7***				2	*1.1*						***26***	***2.0***
Type																												
Colas	46	46	42	46	*4*	*1.1*	46	45	*0*	*1.0*	50	47	45	29	***21***	***1.7***	42	46	47	*4*	*1.1*	48	45	30	49	44	***19***	***1.6***
Fruit Carbonates	40	33	37	42	***9***	***1.3***	37	43	***6***	***1.2***	45	38	38	41	***7***	***1.2***	42	40	39	2	*1.1*	36	43	43	49	40	***13***	***1.3***
Lemonade	15	21	21	12	***9***	***1.8***	17	12	***5***	***1.5***	5	15	17	30	***25***	***5.7***	16	15	14	2	***1.2***	16	13	27	2	17	***26***	***15.2***
Average					***7***	***1.4***			*4*	***1.2***					***18***	***2.9***				*3*	*1.1*						***19***	***6.1***
Average Category					**7**	**1.3**			**4**	**1.2**					**21**	**2.4**				**5**	**1.2**						**26**	**3.8**

(*) Note: 'Dev' = Deviation; 'HH size' = Household size; 'No' = No presence; 'Pre' = Presence; 'Emp' = Employed; 'Unemp' –=Unemployed; 'Reti' = Retired; 'Stu' = Students.

4.3 Detailed results for the whisky category

Table 9 shows the detailed results for the whisky category. As we can see from the table, large deviations appear within the age and employment status variables. Within these variables, most of the deviations and the ratios are larger than 5 points and 1.1, respectively. The average of the deviations are 10 points for the age variable and 14 points for the employment status variable. Respectively, the average of the ratios are 3.5 and 3.4, which is very large compared to the target 1.0.

The main differences in this category are summarised as below:

- For formula variants, the blended whisky appeals more to older buyers and the retired group. It has 84% share within the 65-74 year old group, but only 63% within the under 35 year old group. In contrast, the bourbon/rye variants appeal more to younger buyers: The bourbon/rye variants have 18% share within the under 35 year old group but only 3% within the 65-74 year old group.

- For pack-size variants, the large pack-size appeals more to older buyers and the retired group. It has 34% share within the 55-64 year old group but only 21% within the under 35 year old group. In contrast, the small variant appeals more to younger buyers and the student group. It has 18% share within the student group, but only 7% within the retired group.

- For type variants, the Scotch whisky appeals more to older buyers: 97% share within the 65-74 year old compares to 82% within the under 35 year old group. In contrast, the American whisky appeals more to younger buyers. It has 15% share within the under 35 year old group, but only 1% within the 65-74 year old group. The Canadian/Irish variants appeal more to the student group. It has 14% share within this group but only 2-4% within the other groups.

Table 9. Shares of the whisky variants within demographic groups

Variables		HH size					Children				Age						Social Class					Employment Status						
Whisky	Market Share	1	2	3+	Dev	Ratio	No	Pre	Dev	Ratio	<35	35-44	45-64	65-74	Dev	Ratio	AB	C	DE	Dev	Ratio	Emp	Unemp	Reti	Stu	Not work	Dev	Ratio
Formula																												
Blended/De Luxe	77	81	78	74	**7**	1.1	78	70	**8**	1.1	63	67	76	84	**21**	**1.3**	74	75	82	**8**	1.1	72	72	83	64	79	**19**	**1.3**
Malt	16	15	16	16	2	1.1	15	19	4	**1.2**	19	18	17	13	**6**	**1.5**	18	18	13	**6**	**1.5**	19	17	13	14	12	**7**	**1.6**
Other/Bourbon/Rye	7	5	7	10	**5**	**2.0**	6	11	4	**1.6**	18	15	7	3	**15**	**5.3**	8	8	6	2	**1.3**	9	11	3	21	9	**18**	**6.3**
Average					***4***	***1.4***			***5***	***1.3***					***14***	***2.7***				***5***	***1.3***						***15***	***3.1***
Pack-size																												
Standard	62	57	64	60	**8**	1.1	61	64	3	1.0	68	65	61	60	**8**	1.1	61	62	61	1	1.0	63	78	59	54	60	**24**	**1.5**
Large	32	30	32	33	3	1.1	33	28	**5**	**1.2**	21	28	34	32	**13**	**1.6**	36	33	29	**6**	**1.2**	31	17	34	29	32	**17**	**2.0**
Small	7	13	3	7	**10**	**3.9**	6	9	3	**1.4**	11	7	5	8	**7**	**2.5**	4	5	10	**6**	**2.6**	6	6	7	18	8	**12**	**3.3**
Average					***7***	***2.1***			***3***	***1.2***					***9***	***1.7***				***4***	***1.6***						***18***	***2.2***
Product type																												
Scotch Whisky	93	95	94	90	**5**	1.1	94	89	4	1.0	82	85	93	97	**15**	**1.2**	92	92	94	2	1.0	91	89	97	79	91	**18**	**1.2**
American Whiskey	4	2	3	7	**6**	**4.9**	3	8	**5**	**2.5**	15	12	4	1	**14**	**14.6**	3	5	3	3	**2.0**	6	7	1	7	6	**6**	**5.9**
Other/Canadian/Irish	3	3	3	2	1	**1.5**	3	2	1	**1.5**	4	3	3	2	2	**2.0**	5	2	3	3	**2.5**	3	4	2	14	4	**12**	**7.0**
Average					***3***	***2.8***			***3***	***1.9***					***8***	***6.0***				***3***	***1.8***						***9***	***5.0***
Average Category					**5**	**2.1**			4	**1.5**					**10**	**3.5**				4	**1.5**						14	**3.4**

4.4 Detailed results for the instant coffee category

Table 10 shows the detailed results for instant coffee. As we can see, large differences are found among the age and employment status variables. Within these variables, the averages of the deviations are bigger than 5 points (6 points for age and 9 point for employment status). Similarly, the averages of the ratios are also bigger than 1.0 (1.4 and 1.8, respectively). These figures show that different instant coffee variants appeal to different demographic groups.

These differences are:

- For formula variants, the caffeinated coffee is comparatively more popular to younger buyers and the students group: 91% share within the student group compares to 83% within the retired group. In contrast, the decaffeinated coffee appeals more to the older buyers and the retired segment. It has 17% share within the retired group, but only 9% with the student group.

- For pack-size variants, the small pack-size appeals more to the unemployed group: 56% share within the unemployed group compares to 48% within the employed group. The large pack-size appeals more to the employed group: It has 12% share within this group, but only 4% within the student group. In contrast, the medium pack-size has 53% share within the student group, but only 38% within the employed group.

- For form variants, the granulated variant appeals more to younger buyers: 51% share within the under 35 year old group compares to 41% within the 65-74 year old group. The freeze-dried variant appeals more to older buyers and the higher social class group: 43% share within the AB social class group compares to 29% within the DE social class group. The cappuccino variant is comparatively more popular to the student group. It has 23% share within this group, but only 11-15% within the other groups.

Table 10. Shares of the instant coffee variants within demographic groups

Variables		HH size					Children				Age						Social Class					Employment Status						
Instant Coffee	Market Share	1	2	3+	Dev	Ratio	No	Pre	Dev	Ratio	<35	35-44	45-64	65-74	Dev	Ratio	AB	C	DE	Dev	Ratio	Emp	Unemp	Reti	Stu	Notwork	Dev	Ratio
Formula																												
Caffeinated	85	86	84	86	2	1.0	85	87	2	1.0	89	86	86	82	**6**	1.1	80	86	86	**6**	1.1	86	85	83	91	87	**8**	1.1
Decaffeinated	15	15	16	14	2	**1.2**	15	13	2	1.1	12	14	15	18	**6**	**1.6**	20	14	14	**6**	**1.4**	15	15	17	9	13	**8**	**1.9**
Average					2	*1.1*			2	*1.1*					***6***	***1.3***				***6***	***1.2***						***8***	***1.5***
Pack-size																												
Small	49	54	48	48	**6**	1.1	48	51	3	1.1	52	50	46	52	**7**	1.1	48	47	52	4	1.1	48	56	50	41	49	**16**	**1.4**
Medium	39	36	40	39	3	1.1	40	37	3	1.1	36	37	41	39	**6**	**1.2**	40	39	38	3	1.1	38	34	41	53	39	**19**	**1.5**
Large	11	8	11	11	3	**1.4**	11	11	1	1.0	10	12	12	8	4	**1.4**	10	12	9	2	1.2	12	9	8	4	10	**8**	**2.7**
Multi	1	1	1	2	0	**1.3**	1	1	0	**1.2**	2	1	1	1	1	**2.3**	1	1	1	0	1.4	1	1	1	2	1	2	**3.5**
Average					*3*	***1.2***			2	*1.1*					***4***	***1.5***				2	***1.2***						***11***	***2.3***
Form																												
Granules	47	43	45	49	**5**	1.1	45	51	**6**	1.1	51	50	46	41	**10**	**1.2**	41	46	49	**8**	**1.2**	47	51	41	38	50	**13**	**1.3**
Freeze Dried	32	35	33	30	**5**	**1.2**	33	30	3	1.1	28	31	31	38	**10**	**1.3**	43	32	29	**14**	**1.5**	32	31	37	33	28	**10**	**1.3**
Cappuccino	14	15	14	13	2	1.1	14	12	3	**1.2**	12	11	15	15	3	**1.3**	10	14	13	4	**1.4**	13	11	15	23	12	**12**	**2.1**
Powder	8	7	7	8	2	**1.3**	8	7	0	1.0	9	8	8	6	3	**1.5**	6	7	8	3	**1.5**	7	8	7	7	10	3	**1.4**
Average					***4***	***1.2***			*3*	*1.1*					***7***	***1.4***				***7***	***1.4***						***9***	***1.5***
Average Category					3	**1.2**			2	1.1					**6**	**1.4**				2	**1.3**						**9**	**1.8**

4.5 Detailed results for the soup category

Table 11 shows the detailed results for the soup category. Large deviations are found within the age, social class and employment status variables. Overall, the deviations are 5 points for the age variable, 6 points for the social class variable, and 8 points for the employment status variable. The average ratios are also significant for these variables (1.4, 1.7, and 1.9, respectively).

The differences are shown as below:

- For form variants, the standard variant appeals more to younger buyers. It has 94% share within the under 35 year old group, but only 84% within the 65-74 year old group. In contrast, the condensed variant appeals more to older buyers. It has 16% share within the 65-74 year old group but only 6% within the under 35 year old group.

- For pack-size variants, the small pack-size variant appeals more to the retired group. It has 25% share within the retired group, but only 15% within the student group. In contrast, the large pack-size appeals more to the student group. It has 16% share within this group, but only 10% within the retired group.

- For pack-type variants, the can variant appeals more to the lower social class segment. It has 92% share within the DE social class group but only 79% within the AB group. The tub and carton variants appeal more to the higher social class group: 10% and 8% shares within the AB group but only 4% and 3% within the DE group (respectively).

- For formula variants, the regular variant appeals more to the lower social class group. It has 68% share within the DE group but only 52% within the AB group. In contrast, the fresh variant appeals more to the higher social class group. It has 18% share within the AB group but only 6% within the DE group.

Table 11. Shares of the soup variants within demographic groups

Variables		HH size					Children				Age						Social Class					Employment Status						
Soup	Market Share	1	2	3+	Dev	Ratio	No	Pre	Dev	Ratio	<35	35-44	45-64	65-74	Dev	Ratio	AB	C	DE	Dev	Ratio	Emp	Unemp	Reti	Stu	Notwork	Dev	Ratio
Form																												
Standard	91	90	88	93	4	1.0	89	93	4	1.0	94	93	92	84	9	1.1	90	91	90	2	1.0	92	89	85	91	93	8	1.1
Condensed	9	10	12	7	4	1.6	11	7	4	1.6	6	7	8	16	9	2.5	11	9	10	2	1.2	8	11	15	9	8	8	2.0
Average					*4*	*1.3*			*4*	*1.3*					*9*	*1.8*				*2*	*1.1*						*8*	*1.6*
Pack-size																												
Medium	70	68	67	73	6	1.1	68	74	6	1.1	73	72	70	65	8	1.1	61	70	72	11	1.2	70	72	65	69	76	11	1.2
Small	19	21	21	17	4	1.3	21	17	4	1.2	17	17	18	25	8	1.5	18	19	20	2	1.1	18	19	25	15	16	11	1.7
Large	11	11	12	10	2	1.2	11	10	2	1.2	10	11	11	10	2	1.2	20	11	8	13	2.7	12	9	10	16	8	9	2.1
Average					*4*	*1.2*			*4*	*1.2*					*6*	*1.3*				*9*	*1.7*						*10*	*1.7*
Pack-type																												
Can	89	87	88	91	4	1.0	88	91	3	1.0	90	89	88	89	2	1.0	79	89	92	14	1.2	87	91	89	83	93	11	1.1
Tub	6	7	7	5	2	1.4	6	5	2	1.3	5	6	6	5	1	1.2	10	6	4	6	2.7	7	5	5	8	4	4	2.2
Carton	3	4	4	3	2	1.6	4	3	1	1.4	3	3	4	4	1	1.4	8	3	3	5	3.0	4	3	4	8	2	5	3.3
Average					*3*	*1.4*			*2*	*1.3*					*1*	*1.2*				*8*	*2.3*						*7*	*2.2*
Formula																												
Regular	64	58	60	69	10	1.2	61	70	9	1.1	66	68	63	61	7	1.1	52	64	68	17	1.3	63	69	61	65	71	10	1.2
Low Calorie	12	13	14	11	2	1.2	13	11	2	1.1	14	11	12	13	3	1.3	14	13	11	3	1.3	13	13	13	11	10	3	1.3
Premium	10	13	12	7	6	1.8	12	6	6	2.0	6	7	11	14	8	2.3	12	9	9	3	1.3	9	7	13	5	7	8	2.6
Fresh Soup	9	11	10	7	4	1.5	10	7	3	1.5	8	9	10	8	2	1.3	18	9	6	12	3.0	10	8	9	16	5	11	3.1
Thick Diced	5	5	5	6	1	1.3	5	6	2	1.3	6	6	5	5	2	1.3	5	5	6	1	1.2	5	4	4	3	7	3	2.0
Average					*5*	*1.4*			*4*	*1.4*					*4*	*1.5*				*7*	*1.6*						*7*	*2.1*
Average Category					4	1.3			3	1.3					5	1.4				6	1.7						8	1.9

4.6. Detailed results for the cooking sauces category

Table 12 shows the detailed results for the cooking sauces category. Large deviations are found within the age, employment status and household size variables. On average, the deviations are 7 points for the age variable, 6 points for the employment status variable and 5 points for the household size variable. The average ratios are also significant for these variables (1.7, 1.7, and 1.3, respectively).

The differences are shown as below:

- For pack-size variants, the small pack-size variant appeals more to older buyers and smaller households. It has 60% share within the 65-74 year old group, but only 45% within the under 35 year old group. In contrast, the large pack-size variant appeals more to younger buyers and larger households. It has 22% share within the under 35 year old group, but only 15% within the 65-74 year old group.

- For pack-type variants, the packet-type variant appeals more to the elderly group and the retired group. It has 24% share within the 65-74 year old group, but only 17-19% within the other groups. In contrast, the jar-type variant appeals more to younger buyers. It has 57% share within the under 35 year old group, but only 50% within the 65-74 year old group. The tub-type variant appeals more to the student group. It has 9% share within this group, but only 4-6% within the other groups.

- For formula variants, the cook and pour over sauces and salsa sauces appeal more to younger buyers. The cook and pour over variant has 82% share within the under 35 year old group, but only 69% within the 65-74 year old group. In contrast, the condiment variant appeals more to older buyers. It has 19% share within the 65-74 year old group, but only 7% within the under 35 year old group

Table 12. Shares of the cooking sauces variants within demographic group

Variables		HH size					Children				Age						Social Class					Employment Status						
Cooking sauces	Market Share	1	2	3+	Dev	Ratio	No	Pre	Dev	Ratio	<35	35-44	45-64	65-74	Dev	Ratio	AB	C	DE	Dev	Retio	Emp	Un emp	Reti	Stu	Not work	Dev	Retio
Pack-size																												
Small	49	58	53	46	**12**	**1.3**	52	45	**8**	**1.2**	45	46	50	60	**15**	**1.3**	50	48	51	2	1.0	48	49	58	50	47	**12**	**1.2**
Medium	30	27	30	31	4	1.1	29	32	3	1.1	32	31	30	25	**8**	**1.3**	30	30	29	1	1.0	31	29	26	32	31	**5**	**1.2**
Large	21	15	18	23	**8**	**1.5**	19	24	**5**	**1.3**	22	23	20	15	**7**	**1.5**	20	21	20	1	1.1	22	21	16	18	22	**6**	**1.4**
Average					***8***	***1.3***			***5***	***1.2***					***10***	***1.4***				***1***	***1.1***						***7***	***1.3***
Pack-type																												
Jar	55	52	52	56	**5**	1.1	53	57	4	1.1	57	56	54	50	**7**	1.1	55	55	54	1	1.0	55	56	51	53	56	**6**	**1.1**
Packet	19	18	20	18	2	1.1	19	18	2	1.1	19	17	19	24	**7**	**1.4**	16	18	21	**5**	**1.3**	18	18	23	17	17	**6**	**1.4**
Bottles	6	9	7	6	3	**1.5**	7	6	2	**1.3**	6	6	7	7	2	**1.3**	7	6	6	1	**1.2**	6	7	7	7	6	1	1.1
Tub	6	6	6	6	1	1.1	6	6	0	1.0	6	6	5	4	3	**1.7**	7	6	4	3	**1.6**	6	4	4	9	6	**5**	**2.4**
Other	14	15	15	14	1	1.1	15	14	1	1.1	13	14	15	15	2	**1.2**	14	14	15	1	1.1	14	15	15	15	15	1	1.0
Average					***2***	***1.2***			*2*	*1.1*					*4*	***1.3***				*2*	***1.3***						*4*	***1.4***
Formula																												
Cook+Pour Ovr	77	71	75	79	**8**	1.1	75	80	**5**	1.1	82	79	76	69	**13**	**1.2**	76	78	76	2	1.0	78	79	70	78	77	**9**	1.1
Condiment	11	14	13	9	**5**	**1.5**	13	8	**5**	**1.5**	7	9	12	19	**13**	**2.9**	10	10	13	4	**1.4**	10	11	18	8	10	**11**	**2.4**
Cooking Additives	10	13	10	10	3	**1.3**	11	10	1	1.1	9	10	11	11	2	**1.3**	12	10	10	2	**1.2**	10	10	11	12	11	3	**1.3**
Salsa Sauces	2	2	2	2	0	**1.2**	2	2	0	**1.3**	2	2	1	1	2	**4.0**	2	2	1	1	**2.0**	2	1	1	2	2	2	**3.3**
Average					*4*	***1.3***			*3*	***1.2***					***7***	***2.3***				*2*	***1.4***						***6***	***2.0***
Average Category					**5**	**1.3**			3	**1.2**					**7**	**1.7**				2	**1.3**						**6**	1.7

4.7. Detailed results for the fabric care category

Table 13 shows the detailed results for the fabric care category. Large differences are found within the age, social class and employment status variables. Overall, the deviations are not very large (about 5 points), but the ratios are significant (3.2 for the age variable, 1.3 for the social class variable, and 1.8 for the employment status variable).

The differences are shown as below:

- For form variants, the powder variant appeals more to the lower social class group and the un-employed group. It has 49% share within the DE social class group, but only 33% within the AB social class group. It also has 52% share within the un-employed group, but only 44% within the employed group. In contrast, the tablet variant appeals more to the employed group. It has 32% share within this group, but only 24% within the un-employed group. The liquid variant appeals more to the higher social class group. It has 23% share within the AB social class group, but only 16% within the DE social class group. This might be due to the price difference between the variants as the powder variant is cheaper than the tablet and liquid variants.

- For pack-size variants, the small pack-size variant appeals more to older buyers and smaller households. It has 31% and 33% shares within the 65-74 group and the 1 member household group (respectively), but only 24% within the under 35 year old group and the 3+ member household group. In contrast, the large pack-size variant appeals more to younger buyers and larger households. It has 18% share within the under 35 year old group and 3+ member household group, but only 10% within the 65-74 year old group and 1+ member household group.

- For formula variants, the automatic variant appeals more to younger buyers. It has 99% share within the 35 year old group, but only 93% within the 65-74 year old group. In contrast, the light duty and high suds variants appeal more to older buyers. The light duty variant has 4% share within the 65-75 year old group but only 1% within the under 35 year old group. Similarly, the high

suds variant has 3% with the 65-74 year old group, but 0% within the under 35 year old group.

Table 13. Shares of the fabric care variants within demographic groups.

Variables		HH size					Children				Age						Social Class					Employment Status						
Fabric Care	Market Share	1	2	3+	Dev	Ratio	No	Pre	Dev	Ratio	<35	35-44	45-64	65-74	Dev	Ratio	AB	C	DE	Dev	Ratio	Emp	Unemp	Reti	Stu	Not work	Dev	Ratio
Form																												
Powder	43	45	43	43	2	1.1	43	44	0	1.0	43	42	43	46	*5*	1.1	33	42	49	**16**	**1.5**	40	52	46	44	48	**12**	**1.3**
Tablet	30	27	28	32	**4**	**1.2**	28	33	*5*	**1.2**	31	35	29	26	**9**	**1.3**	33	31	28	*5*	**1.2**	32	24	27	27	29	**8**	**1.3**
Liquid	17	18	19	16	3	**1.2**	19	16	3	**1.2**	17	15	18	19	4	**1.2**	23	18	16	**8**	**1.5**	18	17	19	18	15	4	**1.3**
Capsule	9	9	9	8	1	1.1	9	8	2	**1.2**	8	8	10	9	2	**1.2**	11	9	7	**4**	**1.5**	10	7	8	11	7	**4**	**1.6**
Average					***3***	***1.1***			*2*	***1.2***					***5***	***1.2***				***8***	***1.4***						***7***	***1.4***
Pack-size																												
Medium	58	57	59	58	2	1.0	58	58	1	1.0	58	56	59	59	3	1.0	59	57	59	2	1.0	57	61	60	59	59	**4**	1.1
Small	27	33	28	24	**9**	**1.4**	29	24	*5*	**1.2**	24	26	27	31	**8**	**1.3**	27	26	27	1	1.0	27	23	29	25	24	**6**	**1.3**
Large	15	10	13	18	**8**	**1.8**	13	18	**6**	**1.4**	18	17	14	10	**8**	**1.8**	14	16	13	3	**1.2**	15	16	11	16	17	**6**	**1.6**
Average					***6***	***1.4***			***4***	***1.2***					***6***	***1.4***				***2***	***1.1***						***5***	***1.3***
Formula																												
Automatic Products	98	95	96	99	4	1.0	96	99	3	1.0	99	99	98	93	**6**	1.1	97	98	97	1	1.0	98	98	95	98	99	4	1.0
Light Duty	2	3	2	1	2	**3.5**	2	1	1	**3.0**	1	1	1	4	3	**5.3**	2	1	2	1	**1.5**	1	1	3	2	1	2	**3.1**
High Suds	1	3	2	0	2	**6.3**	2	0	1	**5.3**	0	0	1	3	3	**14.5**	1	1	1	1	**1.6**	1	1	2	1	1	2	**4.4**
Average					*3*	***3.6***			*2*	***3.1***					***4***	***6.9***				***1***	***1.4***						*3*	***2.8***
Average Category					**4**	**2.0**			3	**1.8**					**5**	**3.2**				**5**	1.3						**5**	1.8

4.8. Detailed results for the toothpaste category

Table 14 shows the detailed results for the toothpaste category. Large differences appear within the age and employment status variables. On average, the deviations are about 5 points for the age variable and 7 points for the employment status variable. The ratios are also significant (2.2 for the age variable and 2.5 for the employment status variable).

The differences are shown as below:

- For pack-size variants, the small pack-size variant appeals more to the retired group. It has 7% share within this group, but only 2-4% within the other groups. In contrast, the large pack-size variant appeals more to the student group. It has 66% share within this group, but only 56% within the retired group.

- For pack-type variants, the normal tube-type variant appeals more to older buyers. It has 90% share within the 65-74 year old group, but only 84% within the under 35 year old group. In contrast, the stand up tube-type variant appeals more to younger buyers. It has 4% share within the under 35 year old group but only 1% within the 65-74 year old group. The pump action-type variant appeals to the student group. It has 15% share within this group, but only 8-11% within the other groups.

Table 14. Shares of the toothpaste variants within demographic groups

Variables		HH size					Children				Age						Social Class					Employment Status						
Toothpaste	Market Share	1	2	3+	Dev	Ratio	No	Pre	Dev	Ratio	<35	35-44	45-64	65-74	Dev	Ratio	AB	C	DE	Dev	Ratio	Emp	Unemp	Reti	Stu	Not work	Dev	Ratio
Pack-size																												
Large	61	58	61	62	4	1.1	63	60	2	1.0	60	63	64	55	**10**	**1.2**	62	62	60	3	1.0	64	63	56	66	58	**10**	**1.2**
Medium	35	36	34	36	2	1.1	33	38	**6**	**1.2**	39	36	32	39	**7**	**1.2**	35	35	36	2	1.0	33	36	38	30	39	**9**	**1.3**
Small	3	6	5	2	4	**3.2**	5	2	3	**3.1**	2	2	4	7	**5**	**4.6**	3	3	4	1	**1.3**	3	2	7	4	2	**5**	**4.3**
Average					*4*	***1.8***			*4*	***1.8***					**7**	**2.3**				2	*1.1*						***8***	**2.3**
Pack-type																												
Tube	86	90	87	84	**6**	1.1	87	84	4	1.0	84	84	86	90	**6**	1.1	85	85	87	3	1.0	84	89	89	78	87	**12**	1.1
Pump Action	10	7	10	11	4	**1.6**	10	11	1	1.1	10	**11**	11	8	**4**	**1.4**	12	10	9	2	**1.2**	**11**	8	9	15	9	**7**	**1.9**
Stand Up Tube	2	1	1	3	2	**3.6**	1	4	3	**3.9**	4	3	1	1	**3**	**4.5**	2	2	1	1	**1.6**	2	1	1	2	3	2	**4.5**
Others	2	2	2	2	0	1.1	2	2	0	1.0	2	2	2	2	**1**	**1.6**	1	2	2	1	**1.7**	3	2	2	5	2	4	**3.5**
Average					*3*	***1.9***			*2*	***1.8***					***3***	**2.2**				2	***1.4***						***6***	**2.8**
Average Category					3	**1.8**			3	**1.8**					**5**	**2.2**				2	**1.2**						7	**2.5**

4.9. Detailed results for the bleach and lavatory cleanser category

Table 15 shows the detailed results for the bleach and lavatory cleanser category. Large differences are found within the age and employment status variables. On average, the deviations are about 7 points for these variables. The ratios are also significant (1.3 for both variables).

The differences are shown as below:

- For formula variants, the non-scented variant appeals more to older buyers. It has 32% share within the 65-74 year old group, but only 23% within the under 35 year old group. In contrast, the scented variant appeals more to younger buyers. It has 77% share within the under 35 year old group but only 68% within the 65-74 year old group.

- For pack-size variants, the small pack-size variant appeals more to younger buyers. It has 40% share within the under 35 year old group, but only 34% within the 65-76 year old group. In contrast, the large pack-size variant appeals more to older buyers. It has 14% share within the 65-74 year old group, but only 9% within the under 35 year old group.

Table 15. Shares of the bleach and lavatory cleanser variants within demographic groups

Variables		HH size					Children				Age						Social Class					Employment Status						
Ble/lav Cleansers	Market Share	1	2	3+	Dev	Ratio	No	Pre	Dev	Ratio	<35	35-44	45-64	65-74	Dev	Ratio	AB	C	DE	Dev	Ratio	Emp	Unemp	Reti	Stu	Not work	Dev	Ratio
Formula																												
Scented	73	71	72	75	4	1.0	72	75	3	1.0	77	76	73	68	**9**	1.1	73	74	71	3	1.0	75	74	67	75	73	**8**	1.1
Non-scented	27	29	28	25	4	1.1	28	25	3	1.1	23	24	27	32	**9**	**1.4**	27	26	29	3	1.1	25	26	33	25	27	**8**	**1.3**
Average					*4*	*1.1*			*3*	*1.1*					***9***	***1.3***				*3*	*1.1*						***8***	***1.2***
Pack-size																												
Standard	53	53	52	53	1	1.0	53	53	0	1.0	51	54	53	52	2	1.0	53	53	52	1	1.0	53	56	51	58	53	**6**	1.1
Small	36	34	37	37	3	1.1	35	38	2	1.1	40	37	35	34	**6**	**1.2**	36	37	35	1	1.0	37	35	34	31	36	**6**	**1.2**
Large	11	13	12	10	3	**1.2**	12	10	2	**1.2**	9	10	12	14	**5**	**1.6**	11	11	13	2	**1.2**	10	9	15	11	12	**6**	**1.8**
Average					*2*	*1.1*			*2*	*1.1*					***5***	***1.3***				*1*	*1.1*						***6***	***1.4***
Average Category					3	1.1			2	1.1					**7**	**1.3**				2	1.1						**7**	**1.3**

4.10. Detailed results for the soap category

Table 16 shows the detailed results for the soap category. Large differences appear within the age and employment status variables. On average, the deviations are about 7 points for the age variable and 9 points for the employment status variable. The ratios are also significant (1.6 for the age variable and 1.8 for the employment status variable).

The differences are shown as below:

- For formula variants, the regular variant appeals more to older buyers. It has 77% share within the 65-74 year old group, but only 67% within the under 35 years old group. In contrast, the moisturising variant appeals more to younger buyers. It has 19% share within the under 35 year old group but only 13% within the 65-74 year old group. The sensitive variant also appeals more to younger buyers. It has 7% share within the under 35 year old group, but only 2% within the 64-75 year old group.

- For pack-size variants, the small pack-size variant appeals more to younger buyers. It has 48% share within the under 35 year old group, but only 36% within the 65-76 year old group. In contrast, the large pack-size variant appeals more to older buyers. It has 6% share within the 65-74 year old group, but only 3% within the under 35 year old group.

Table 16. Shares of the soap variants within demographic groups

Variables		HH size					Children				Age						Social Class					Employment Status						
Soap	Market Share	1	2	3+	Dev	Ratio	No	Pre	Dev	Ratio	<35	35-44	45-64	65-74	Dev	Ratio	AB	C	DE	Dev	Ratio	Emp	Unemp	Reti	Stu	Not work	Dev	Ratio
Formula																												
Regular	76	76	76	76	0	1.0	77	75	2	1.0	67	78	78	77	**11**	**1.2**	82	76	75	**8**	1.1	77	69	77	70	75	**8**	1.1
Moisturising	14	13	14	14	1	1.1	14	14	1	1.0	19	13	12	13	**7**	**1.5**	11	14	15	4	**1.3**	14	16	13	20	13	**8**	**1.6**
Cleansing	7	8	7	6	3	**1.4**	7	7	0	1.0	7	6	6	8	2	**1.3**	3	7	8	**5**	**2.8**	6	8	7	4	7	**5**	**2.2**
Sensitive	3	3	3	4	1	**1.4**	3	5	2	**1.6**	7	3	3	2	**4**	**2.8**	4	3	3	1	**1.2**	3	6	3	6	5	3	**2.2**
Average					*1*	***1.2***			*1*	***1.2***					***6***	***1.7***				*4*	***1.6***						***6***	***1.8***
Pack-size																												
Medium	55	52	55	56	4	1.1	57	53	4	1.1	49	54	58	58	**9**	**1.2**	58	56	54	4	1.1	56	47	57	42	54	**15**	**1.4**
Small	40	43	40	39	4	1.1	38	43	**5**	1.1	48	42	37	36	**12**	**1.3**	36	40	41	**5**	1.1	40	50	37	56	41	**19**	**1.5**
Large	5	5	6	4	1	**1.3**	5	4	1	**1.4**	3	4	5	6	3	**1.9**	6	5	5	1	**1.2**	5	4	6	2	5	4	**2.9**
Average					*3*	*1.1*			*3*	***1.2***					***8***	***1.5***				*3*	*1.1*						***13***	***1.9***
Average Category					2	**1.2**			2	**1.2**					**7**	**1.6**				3	**1.3**						**9**	**1.8**

4.11. Overall results for nine product categories

Table 17 shows the overall results of the study for nine product categories. As can be seen from the table, around 50% of the average deviations are 5 percentage points or more and most of the average ratios are 1.2 or bigger (80%). These figures show that there are many differences in the market shares of the product variants across the demographic groups in all nine categories. Consistent across all nine product categories, the largest differences are found among the age and employment status variables. For example, with the soft drinks category, the averages of the deviations are 21 points for the age variable and 26 points for the employment status variable. With the whisky category, the averages of the deviations are 10 points for the age variable and 14 points for the employment status variable. In the case of the fabric-care category, even though the averages of the deviations are not very large (around 5 percentage points for the age and employment status variables), the averages of the ratios are significant (3.2 for the age variable and 1.8 for the employment status).

The appendix shows the significant and non-significant contingency tables of amounts purchased for each product variant and demographics. Of 130 contingency tables analysed, only one is non significant. The rest of the tables are significant at .001 level or less. This indicates evidence of association between demographics and purchase of product variants.

Table 17. Averages of deviations and of ratios

Variables	1. HHsize		2. Children		3. Age		4. Social Class		5. Emp Status	
Categories	Dev	Ratio	Dev	Ratio	Dev	Ratio	Dev	Ratio	Dev	Ratio
1. Soft Drinks	***7***	***1.3***	***4***	***1.2***	***21***	***2.4***	***5***	***1.2***	***26***	***3.8***
Formula	7	1.1	5	1.1	19	1.5	10	1.2	26	1.9
Pack-size	6	1.3	5	1.3	26	3.5	6	1.3	34	5.3
Pack-type	8	1.2	0	1.0	21	1.7	2	1.1	26	2.0
Type	7	1.4	4	1.2	18	2.9	3	1.1	19	6.1
2. Whisky	***5***	***2.1***	***4***	***1.5***	***10***	***3.5***	***4***	***1.8***	***14***	***3.4***
Formula	4	1.4	5	1.3	14	2.7	5	1.3	15	3.1
Pack-size	7	2.1	3	1.2	9	1.7	4	1.6	18	2.2
Type	3	2.8	3	1.9	8	6.0	2	2.5	9	5.0
3. Instant Coffee	***3***	***1.2***	2	***1.1***	***6***	***1.4***	***5***	***1.3***	***9***	***1.8***
Formula	2	1.1	2	1.1	6	1.3	6	1.2	8	1.5
Pack-size	3	1.2	2	1.1	4	1.5	2	1.2	11	2.3
Form	4	1.2	3	1.1	7	1.4	7	1.4	9	1.5
4. Soup	***4***	***1.3***	***3***	***1.3***	***5***	***1.4***	***6***	***1.7***	***8***	***1.9***
Formula	5	1.4	4	1.4	4	1.5	7	1.6	7	2.1
Pack-size	4	1.2	4	1.2	6	1.3	9	1.7	10	1.7
Pack-type	3	1.4	2	1.3	1	1.2	8	2.3	7	2.2
Form	4	1.3	4	1.3	9	1.8	2	1.1	8	1.6
5. Cooking Sauces	***5***	***1.3***	***3***	***1.2***	***7***	***1.7***	***2***	***1.3***	***6***	***1.7***
Formula	4	1.3	3	1.2	7	2.3	2	1.4	6	2.0
Pack-size	8	1.3	5	1.2	10	1.4	1	1.1	7	1.3
Pack-type	2	1.2	2	1.1	4	1.3	2	1.3	4	1.4
6. Fabric Care	***4***	***2.0***	***3***	***1.8***	***5***	***3.2***	***4***	***1.3***	***5***	***1.8***
Formula	3	3.6	2	3.1	4	6.9	1	1.4	3	2.8
Pack-size	6	1.4	4	1.2	6	1.4	2	1.1	5	1.3
Form	3	1.1	2	1.2	5	1.2	8	1.4	7	1.4
7. Toothpaste	***3***	***1.8***	***3***	***1.8***	***5***	***2.2***	***2***	***1.2***	***7***	***2.5***
Pack-type	4	1.8	4	1.8	7	2.3	2	1.1	8	2.3
Pack-size	3	1.9	2	1.8	3	2.2	2	1.4	6	2.8
8. Ble/Lav cleanser	***3***	***1.1***	2	***1.1***	***7***	***1.3***	2	***1.1***	***7***	***1.3***
Formula	4	1.1	3	1.1	9	1.3	3	1.1	8	1.2
Pack-size	2	1.1	2	1.1	5	1.3	1	1.1	6	1.4
9. Soap	2	***1.2***	2	***1.2***	***7***	***1.6***	***3***	***1.3***	***9***	***1.8***
Formula	1	1.2	1	1.2	6	1.7	4	1.6	6	1.8
Pack-size	3	1.1	3	1.2	8	1.5	3	1.1	13	1.9
AVERAGE	4	1.5	3	1.4	8	2.1	4	1.4	10	2.2

* 'Dev' = *Deviation*. Recall that *Deviation* is Max share – Min share, and *Ratio* is Max share/Min share

Table 18 qualitatively summarises the different appeals of the product variants to different segments of buyers across nine categories. As can be seen from the table, for the food and drink categories, the healthy variants such as diet drinks, decaffeinated instant coffee, and premium soup appeal more to an older buyer segment. In contrast, the regular or standard variants appeal to a younger aged segment. This is in line with the a priori expectation that older people buy more healthy variants because they might be more concerned about their health.

For the cleaning categories, the 'traditional' variants such as normal tube-type toothpaste, non-scented bleach and lavatory cleanser, regular soap, and non-automatic fabric care appeal more to older buyers whereas the 'new' variants such as stand up tube-type toothpaste, scented bleach and lavatory cleanser, moisturising and sensitive soap, and automatic fabric care appeal more to younger buyers. This indicates that older buyers tend to stick with 'traditional' variants, rather than try new variants (Silvers, 1997). And younger buyers tend to adopt 'new' variants more than older buyers (Huh and Kim, 2008).

There was an unexpected finding that the household size variable is weakly associated with pack-size buying. In five categories, household size alone cannot explain the buying behavior for different pack-sizes. This might be explained by the reason that some large households might contain small children, thus these households might buy both small and large pack-size variants for different individuals within the household. Another explanation might be that some buyers are more convenient orientated than others, thus they might buy more small size variants. These might suggest that the drivers of choice of different pack-sizes might be the buyers' attitudes towards shopping and the age of individuals within the household rather than the household size.

However, the findings show that there is a strong association between pack-size buying and age. For the drink categories such as whisky and soft-drinks the large size variants appeal more to the older group while the small size variants appeal more to the younger group. By contrast, for the food categories, older buyers buy more small size variants while younger buyers buy more large size variants. There are mixed results among the cleaning categories. The small size variants appeal more

to older buyers in the toothpaste and fabric care categories, but to younger buyers in the bleach and lavatory cleanser and soap categories. This suggests that pack-size buying associates more with characteristics of *individuals* within the household (e.g. age of the principle shopper) than characteristics of the *entire* household (e.g. household size). The results also suggest that market segmentation for pack-sizes might be category specific. For example, for some products such as whisky variants, they can be stored a long period after the first use. But, for others such as soup variants, they are not storable after use. As a result, older buyers might buy the large pack-size whisky variant for repeated uses but the small soup variant for one use only. Therefore, brand managers have to look at each category to see what the usage segments are.

The results suggest that age is a crucial measure for market segmentation of product variants. This can be explained by the reason that older and younger consumers might have different needs and wants (e.g. older consumers might want more healthy food than younger consumers). They might also have different attitudes and behaviors (e.g. older consumers are more likely to stick with the 'traditional' products than younger consumers). As a result, they are attracted to different types of products. Therefore, understanding the differences in needs, wants, attitudes and behaviors across different age groups is essential for developing and marketing product variants.

The results also indicate that the employment status variable is an important measure for market segmentation of product variants. Different employment status groups tend to buy different product variants. This could be explained by the reason that employment status is associated with income. People with less income might buy different variants compared to those with higher income. For example, the employed group tends to buy more large pack-size variants while the unemployed group buys more small size variants within the instant coffee category. The employed group also tends to buy more expensive variants (e.g. tablet-type fabric cares) while the unemployed group buys cheaper variants (e.g. powder-type fabric cares). As such, it is necessary to take in to account the differences in consumer affordability across different segments in developing and marketing product variants.

Although the findings of this thesis show that there are strong associations between buyers' demographic characteristics and product variants buying, it is not evident that a particular demographic group buys only a specific product variant. For example, American whiskey has much higher share among younger age groups, but this does not mean that all young people drink this product variant. This is an important point because in order to target a demographic group more efficiently, it is needed to further examine other factors such as consumers' needs and wants, buying situation that influence their choice of a particular product variant (Dibb and Simkin, 2008). For example, different situation or occasion might affect buyers' choice of products. A young adult might drink American whiskey with their young fellows but Scotch whiskey with their older counterparts. Therefore, understanding these underlying factors will enhance the quality of the broad demographic segments found in this thesis.

Table 18. Market segments for product variants in nine categories

Drink categories	Soft drinks	Market segments: these variants particularly appeal to:	Whisky	Market segments: these variants particularly appeal to:	Instant Coffee	Market segments: these variants particularly appeal to:
Formula	Regular	Young, Class DE, Students	Blended/ De Luxe	Elderly, Retired	Caffeinated	Young, Students
	Diet	Middle age, Older, Class AB, Employed	Malt	Young, Employed	Decaffeinated	Elderly, Retired
			Bourbon/ Rye/Other	Students, Young		
Pack-size	Large	Elderly, Retired	Large	Elderly, Retired	Large	Employed, 3+ member HH
	Small	Young, Students	Small	Young, Students	Small	Unemployed, 1 member HH
Pack-type	Bottles	Elderly, Retired				
	Cans	Young, Student				
Product type		HH with children, Students	Scotch Whisky	Elderly, Retired	Granules	Young, Class DE, Unemployed
	Fruit Carbonates Lemonade	Elderly, Retired	American Whisky	Young, Students	Freeze Dried	Elderly, Class AB, Retired
	Colas	Young, Students			Cappuccino	Students
Food categories	Soup	Market segments: these variants particularly appeal to:	Cooking sauces	Market segments: these variants particularly appeal to:		
Formula	Regular	Class DE	Condiment Sauces Salsa Sauces	Elderly, Retired		
	Premium	Retired		Young, Students		
	Fresh Soup	Class AB				
	Thick Diced	Not working				
Pack-size	Small	Retired	Small	Elderly, 1 member HH		
	Large	Students	Large	Young, 3+ member HH		
Pack-type	Can	Class DE, Unemployed, Not working	Packet	Elderly, Retired		
	Tub	Class AB, Employed	Tub	Young, Students		
	Carton	Class AB, Employed				
Product type	Standard	Young, Students				
	Condensed	Elderly, Retired				

Table 18. Market segments for product variants in nine categories (Continued)

Cleaning categories	Fabric Care	Market segments: these variants particularly appeal to:	Toothpaste	Market segments: these variants particularly appeal to:	Ble/lav cleanser	Market segments: these variants particularly appeal to:	Soap	Market segments: these variants particularly appeal to:
Formula	Automatic	Young, 3+ member HH			Scented	Young	Regular	Middle age and elderly
	Light Duty	Elderly, 1 member HH			Non-scented	Elderly, Retired	Moisturising	Young
	High Suds	Elderly, 1 member HH					Sensitive	Young
Pack-size	Small	Elderly	Small	Elderly	Small	Young	Small	Young, student
	Large	Young	Large	Young	Large	Elderly	Large	Elderly, retired
Pack-type			Tube	Elderly				
			Pump action	Student				
			Stand up tube	Young				
Product type	Powder	Class DE, Unemployed						
	Liquid	Class AB						
	Tablet	Class AB, Employed						

4.12. Chapter conclusion

The main findings of this thesis are that there are many differences in market shares of product variants among different demographic groups of buyers. The largest differences are found within the age and employment status variables. This demonstrates that different product variants do appeal to different market segments. Age and employment status variables are good bases for market segmentation of product variants.

Chapter 5 Implications, Limitations and Future Research

5.1 Chapter Introduction

This chapter discusses the implications of the thesis findings including the academic implications and the implications for the management, competitive tactics and marketing communications of product variants. The chapter also shows the limitations of this thesis and recommends for future research directions. Finally, the chapter summaries the contributions of this thesis to the marketing literature as well as to the marketing practice.

5.2 Main Findings

- Overall, there are many differences in market shares of product variants among different demographic groups of buyers. The largest differences are found within the age and employment status variables in all categories. This indicates that demographic-based market segmentation for product variants does exist

- For the food and drink categories, the healthy variants such as diet drinks, decaffeinated instant coffee, and premium soup appeal more to an older buyer segment. In contrast, the regular or standard variants appeal to a younger aged segment.

- For the cleaning categories, the 'traditional' variants such as normal tube-type toothpaste, non-scented bleach and lavatory cleanser, regular soap, and non-automatic fabric care appeal more to older buyers whereas the 'new' variants such as stand up tube-type toothpaste, scented bleach and lavatory cleanser, moisturising and sensitive soap, and automatic fabric care appeal more to younger buyers.

- Expensive variants appeal more to employed buyers whereas cheaper variants appeal more to unemployed buyers

- There is a weak association between household size and purchase of different pack-sizes. In five categories, household size alone cannot explain the buying behavior for different pack-sizes.

- There is a strong association between pack-size and age in all categories.

- There is a lack of 100% share to any particular variant.

5.3 Implications

For academic implications, this thesis makes an important contribution to the marketing literature by showing that there is demographic segmentation for product variants. Previous studies have found little or no demographic segmentation for competing brands. One of the possible reasons is that competing brands tend to carry a similar range of product variants. The findings of this thesis suggest that the functional distinctiveness of a product variant is the driver of choice of that variant rather than its brand name. This is in line with the findings of Jarvis *et al.* (2007) that consumers are loyal to product attributes rather than brand name. As such, instead of looking for brand-based segments, marketing researcher should focus on product variant-based segmentation, which is a more realistic and useful way of segmentation.

Furthermore, the findings of this thesis also indicate that market segmentation is still possible for markets that have been described in the marketing literature as Dirichlet-type (see Ehrenberg *et al.,* 2004). As such, if the data show no relationship between the choice of different product variants - no discrete groups of buyers who buy different product variants (e.g. Singh *et al.,* 2004), it is still worthy to look for market segments of the product variants. In other words, the assumption that the market is un-segmented is not essential to the NBD-Dirichlet model. It is more accurate to describe the Dirichlet-type markets as non-partitioned rather than unsegmented markets.

The findings of this thesis suggest that some demographic variables are better than others for market segmentation of product variants. The variables such as age and employment status are crucial measures. This might reflect the association between product variants and consumer needs and affordability. As we can see from the results chapter, different product variants appeal to different age and employment status groups. For example, older buyers purchase more healthy variants while younger buyers purchase more regular variants. This can be explained by the reasons that older and younger consumers have different needs; employed and unemployed consumers have different income levels that affect their affordability. As such, in order to better use of these broad demographic segments, it is essential to relate them

to other factors that can describe why consumers choose a particular product variant. For instance, older buyers buy more healthy variants because they are more concerned about their health, which could be related to the benefit segmentation variable.

In addition to the academic implications, several practical implications can be drawn from the main findings above. First, for existing product variants, the results indicate it is desirable to examine sales performance not only at the overall market level but also across different groups of buyers. Thus, marketers will gain a comprehensive picture of their products' performance in different demographic buyer groups. As shown in the results section, a particular variant might achieve higher performance level in one group but lower performance level in another group. Answering the question of why the same variant has different appeals among different groups will help the marketers to develop their marketing strategies to meet different segments' needs and wants.

Second, for new product development, it does seem possible to develop a new variant that appeals to a particular group of buyers. Since different demographics seem to have different needs and wants, designing a specific variant to satisfy the needs of a particular demographic group might increase the chance for product success. For example, marketers might develop a healthy variant and target the elder segment that has greater interest in buying the product. By doing so, marketing managers can identify marketing opportunities more effectively and efficiently.

The results also have some implications for ongoing management of price tactics. For example, when promoting a particular product variant such as the large pack-size variant in the soft-drinks market, the shares of the other variants under the same brand could be cannibalised. If knowing that the large pack-size variants appeal to older buyers and the small pack-size variants appeal to younger buyers, marketers might avoid or minimise cannibalisation effects by selectively targeting the older buyer segment with price promotion for the large pack-size variants. For example, marketers could use coupons or trading stamps to target the older buyer segment.

Practical implications for marketing communications can also be obtained from the results. Because product variants appeal to different segments, marketers should

select different media vehicles for different product variants (Fennell and Allenby, 2004). This would be a good strategy to grow share of each variant in each segment. For example, with the drinks categories, marketers could select a media vehicle that exposes to younger viewers to advertise colas soft drinks, American whisky, and caffeinated coffee variants. On the other hand, they could select a media vehicle that exposes to older viewers to advertise lemonade soft drinks, Scotch whisky, and decaffeinated coffee variants.

The results also have implications for geo-demographic based micro-marketing strategies (Montgomery, 1997; Kalyanam and Putler, 1997). Because different product variants appeal to different demographic groups, retailers with different geo-demographic bases should adjust their product assortments. For example, if a retailer is located near a retirement village, it should stock more 'traditional' variants for the cleaning categories. In contrast, if one is located near an university, it should stock more 'new' variants.

Last but not least, it should be noted that demographics could only partly explain product variant buying. Together with demographics, marketers need to understand the underlying reasons why consumers buy a particular product variant. This could be related to consumer needs and wants, attitudes and behavior, and buying situation etc. Without obtaining adequate information about consumers, it is difficult to target consumers effectively (Dibb and Simkin, 2008). Usage occasion or situation is a promising candidate for inclusion in such research. The reason is that a buyer might purchase different product variants according to different occasions (e.g. a house wife might buy a large pack of soup for family meal but a small pack for her lunch at work). Incorporating this type of variable with demographics will help marketers produce more useful segmentation results.

5.4 Limitations and Future Research

There are some limitations of this thesis that need to be addressed. First, the input data for the analysis is household data, not individual data. Because a household might contain individuals who have different needs, a market segmentation analysis at the household level might reduce the chance to reveal segments. Therefore, there might be more segmentation than discovered. For example, a household might include children and older adults. Then if the principal shopper purchases soft drinks, she might buy lemonade for herself and colas for the children. As such, an analysis at the household level might mask the difference between individuals within the household. Future research might examine market segmentation for product variants at the individual level. Given the positive findings at the household level, there might be even stronger results at the individual level, as previously suggested by Kahn *et al.* (1986).

Second, the thesis only investigates the consumer demographic characteristics whereas market segmentation can be classified in many other different ways such as psychographic, behaviour, purchase occasion and benefit. However, the scope of this thesis is to examine multiple product categories whereas some of these variables (e.g. purchase occasion and benefit) are product category specific, which is rather limited for such a multiple category study. Future research could extend to investigate these variables where it is applicable or within a specific category. For example future research could investigate which benefits that different soup variants offer and relate them to consumer demographic characteristics. Knowing which variables associate with product variant buying will help marketers target consumers more efficiently.

Third, this research has been limited to the analysis of a single independent variable at a time. The research could be extended to incorporate two or more independent variables in a multivariate analysis. As suggested by (Bass *et al.*, 1968), market segmentation will be further revealed when multiple variables are used in the analysis. Recently, Trinh *et al.* (2008) examined the relationship between three variables: employment status, buying situations and pack-size buying. They found that within a demographic group, different buying situation generate different preferences for product attributes. This suggests that even though demographics are

good bases for segmentation, the outcome of market segmentation will be better if we could combine demographics with other segmentation bases such as situation or occasion.

Fourth, this thesis only looks at one variant at a time. In the reality, consumers actually buy a combination of variants (e.g. a small bottle of diet Coke). Future research could extend to examine market segmentation for multi-dimensional variants such as small size regular coffee versus large size de-caffeinated coffee. This type of research will help us identify the effect of combinations of variants on buyer behaviors and the associations with buyers' characteristics at this complex level. Yet, such an analysis starts to get category specific findings and diminishes the opportunity for generalised findings, which is out of the scope of this thesis.

Finally, this thesis has been limited to the consumer-packaged goods. Future research could examine variant-based segmentation in durable goods and service categories. For example, future research could investigate if market segmentation occurs to different car variants (e.g. 2 door versus 4 door cars); or different automobile insurance policies (e.g. comprehensive versus third party policies). This thesis has also been limited to the UK data. Future research can extend to different countries (e.g. Do the patterns found in this thesis also hold in the USA?). This will help us broaden our knowledge of market segmentation for product variants as well as provide empirical generalisations on this important topic.

5.5 Conclusion

Despite its limitations, this thesis has advanced the marketing literature by providing systematic empirical findings on market segmentation for product variants. This is an important contribution to the knowledge of consumer behaviour to different product variants. Results in brand segmentation show that demographics play a little role in explaining brand preference. One of the reasons is because marketers have responded to competitive efforts as categories develop more variants. This thesis has focused on the variants themselves, which is a more realistic and useful way of segmentation. With the findings across nine product categories, it is concluded that demographics such as age and employment status are good bases for market segmentation of product variants. Thus, marketing researchers and practitioners are encouraged to use demographics in market segmentation studies at the product level. Furthermore, the fact that functionally different products variants attract different market segments of buyers indicates that target marketing is implementable at the product level. This reinforces the usefulness of target marketing for different product variants in both marketing theory and practice.

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Appendix

Tables from each category, summarising chi-square test for each product variant and each demographic.

*** = p < .001

** = p >= .001

SOFT DRINKS

Table 19: Summarising chi-square test for each soft drink variant and each demographic.

Soft drinks variants	HH size	Children	Age	Social Class	Emp Status
Formula	***	***	***	***	***
Pack-size	***	***	***	***	***
Pack-type	***	**	***	***	***
Type	***	***	***	***	***

WHISKY

Table 20: Summarising chi-square test for each whisky variant and each demographic.

Whisky variant	HHsize	Children	Age	Social Class	Emp Status
Formula	***	***	***	***	***
Pack-size	***	***	***	***	***
Type	***	***	***	***	***

INSTANT COFFEE

Table 21: Summarising chi-square test for each instant coffee variant and each demographic.

Instant coffee variants	HHsize	Children	Age	Social Class	Emp Status
Formula	***	***	***	***	***
Pack-size	***	***	***	***	***
Form	***	***	***	***	***

SOUP

Table 22: Summarising chi-square test for each soup variant and each demographic.

Soup variants	HHsize	Children	Age	Social Class	Emp Status
Formula	***	***	***	***	***
Pack-size	***	***	***	***	***
Pack-type	***	***	***	***	***
Form	***	***	***	***	***

COOKING SAUCES

Table 23: Summarising chi-square test for each cooking sauces variant and each demographic.

Cooking sauce variants	HHsize	Children	Age	Social Class	Emp Status
Formula	***	***	***	***	***
Pack-size	***	***	***	***	***
Pack-type	***	***	***	***	***

FABRIC CARE

Table 24: Summarising chi-square test for each fabric care variant and each demographic.

Fabric care variants	HH size	Children	Age	Social Class	Emp Status
Formula	***	***	***	***	***
Pack-size	***	***	***	***	***
Form	***	***	***	***	***

BLEACHES AND LAVATORY CLEANSERS

Table 25: Summarising chi-square test for each bleach and lavatory cleanser variant and each demographic.

Bleaches and lavatory cleaner variants	HH size	Children	Age	Social Class	Emp Status
Pack-type	***	***	***	***	***
Pack-size	***	***	***	***	***

TOOTHPASTE

Table 26: Summarising chi-square test for each toothpaste variant and each demographic.

Toothpaste variants	HH size	Children	Age	Social Class	Emp Status
Formula	***	***	***	***	***
Pack-size	***	***	***	***	***

SOAP

Table 27: Summarising chi-square test for each soap variant and each demographic.

Soap variants	HH size	Children	Age	Social Class	Emp Status
Formula	***	***	***	***	***
Pack-size	***	***	***	***	***