Abstract

Bar code scanning data pertaining to the urban carbohydrate market were analysed. Emphasis was placed on the strategic importance of the data to the marketing of maize meal products. Elasticities indicate that maize meal and potatoes tend to be relatively price inelastic, whilst bread and rice are more price elastic. Important results emanating from the analyses are that the relative price and the convenience of a product play an important role in the purchasing of a product in the carbohydrate market. Characteristics of the consumers of maize meal were determined for both Black and White consumers, thereby enabling a more informed targeting of advertising campaigns. Other strategic information extracted from the data indicates the practical nature and usefulness of such data.

Opsomming

Ontleding van aftasdata met spesifieke verwysing na die Suid-Afrikaanse mark vir koolhuidrate

Lynkode aftasdata met betrekking tot die stedelike mark vir koolhuidrate is ontled. Klem is geleg op die strategiese belangrikheid van die data vir die bemarking van mieliemeelprodukte. Elastisiteite toon dat mieliemeel en aartappels relatief prysonelasties is, terwyl brood en ryis meer pryselasties is. Belangrike resultate voortspruitend uit die ontledings is dat die relatiewe prys en gerieflikheid van die produk 'n belangrike rol speel in die aanskaf van 'n produk in die koolhuidratemark. Eienskappe van die verbruikers van mieliemeel is bepaal vir beide Swart en Wit verbruikers om sodoende 'n beter ingeligde afbakening van advertensies veldtogte teen te bring. Ander strategiese inligting verkry uit die data toon die praktiese aard en waarde van sulke data.

1. Introduction

The single most limiting and time consuming factor in research is the acquisition of timely and accurate data. Nieuwoudt (1973) and Groenewald (1990) highlight limitations within South African data sources.

Research should ideally be relevant, timely, accurate and practical. Bar code scanning provides a source of data that makes these objectives possible. This system of scanner check-out data collection originated in the USA in the mid-1970s and has created a new era of consumer research. Apart from Jourdan (1981) and McLaughlin and Lesser (1986), few demand analyses have been based on scanner data. Scanning data has been available in South Africa for approximately two years and is making new inroads into local consumer research.

Scanner information constitutes a nontraditional data source for economic applications. The richness of scanner data lies in the fact that quantity, price, and hence expenditure information for a multitude of products are available on a daily basis (Capps, 1989). The scanner data available in South Africa has an additional refinement over that presented in previous research, being that of linking demographic data to the products purchased. A panel of consumer members is selected according to the AMPS profile so as to be representative of the local urban population. Unlike the research done by Capps (1989), the retail firms in this study cater to all income groups and not only to high income customers. Since the end of 1988, data have been collected and processed for chain stores in urban areas throughout South Africa.

The removal of influx control in 1987 led to rapidly increasing levels of urbanisation. The percentage of the total Black population living in urban areas is forecast to reach 56.4% by 1990, 66.7% by 2000 and 74.0% by the year 2010 (Spies, 1988). Maize meal is a staple diet for the Black population and the study focuses on this product. Urban data are therefore of cardinal importance as it not only gives an indication of the current situation in urban areas, but also provides insight into the future, especially with respect to appropriate marketing strategies.

The study on the urban carbohydrate market also illustrates the usefulness of bar code scanning data. Bar code scanning methods will without doubt, make significant contributions to improve marketing to the consumer of the 1990's. The research centred on market share, elasticities, general buying patterns and finally prediction of the possible user type of maize meal. Throughout the article practical and usable information is highlighted and conclusions drawn.

Bar code scanning refers to a bar code on the side of a product. The codes contain product information such as mass, product type, brand information and price. Bar coding information is scanned at the check-out till, stored in a centralised computer and can be retrieved as desired.

Demographic data is linked to the products purchased, the panel of consumer members being selected so as to be representative of the AMPS profile. When making a purchase these members display what is called a VIP scanning card which enables purchase data to be coupled to that specific consumer. Monthly data over a 15-month period (January 1989 - March 1990) relating to the number of purchases, product price and mass were collected from 22 chain stores in the metropolitan areas of Johannesburg/Soweto, Cape Town, East London, Reef, Durban, Pretoria and Port Elizabeth. The data are thus more representative of urban areas than that of Capps (1989) who used data pertaining to a single store.

2. Market share

As competition within the carbohydrate market increases, so does the necessity of keeping tabs on market share. For example, gone are the days when maize products occupied the...
most dominant position in the market. This is especially true of the urban market where the variety of carbohydrates available to the consumer is wide. The expansion of the chain store network throughout the country has probably strengthened this phenomenon.

Figure 1 indicates the current percentage market share of some of the most important sources of carbohydrate. Market share is based on the total number of kilograms purchased per month at chain stores in the above-mentioned urban areas. This will deviate from the total urban share.

There was a definite increase in market share for potatoes during February 1990, whereas that of bread, maize products and rice decreased. Subsequent analyses will indicate that this phenomenon is price driven.

The market share of rice peaked in December and the possibility of the effects of the festive season cannot be ruled out. Post December peaks were evident in bread, maize products and potatoes. Collection and analysis of data over a longer period of time are needed to clarify whether or not these movements are repetitive, therefore indicative of normal seasonal effects. Interesting to note is that in urban areas the market shares of maize meal and bread appear to move in unison, a phenomenon that may have important implications.

The coefficient of variation (CV) is used throughout the article to indicate the degree of variability of certain variables. This measure, when applied to market share, is indicative of the stability of the market for that specific product. Although not readily visible in Figure 1, the market shares of bread (CV = 9%), maize products (CV = 15%), rice (CV = 15%) and instant cereal (CV = 16%) are more constant than those of hot cereal (CV = 20%), potatoes (CV = 24%) and pasta (CV = 34%).

It can thus be concluded that in urban areas, bread holds the largest portion of the carbohydrate market (as defined in this study) and this market share tends to show relatively little variation. A number of reasons for this state of affairs may be put forward. First and foremost, is the possibility that bread is a form of instant food which is convenient, relatively cheap and fits in well with the fast pace of life in urban areas. Secondly it is widely accepted and used by all of South Africa’s race groups.

Potatoes have the second largest market share. March statistics show that potato prices are making a recovery and that maize products and rice could challenge the position of potatoes in the market should the potato price continue to rise. The market position held by potatoes tends to fluctuate widely as a result of variation in its relative price.

It would appear that maize products hold a fairly constant share of the market. In December there appears to have been a substitution of rice and to a lesser extent maize products for potatoes and bread. Such a substitution could be linked to a seasonal effect in combination with a relatively high potato price towards the latter part of 1989. Post-December peaks in market share were evident in potatoes, bread and maize products which could have been caused by relative price changes.

3. Responsiveness to price changes

When setting the price of a product it is important to determine the effect that such price changes will have on the consumption of the end product, especially if one is concerned with the maintenance of market share.

Three methods were considered to analyse the relationship between changes in two variables, namely change in price and change in quantity.

- Correlation coefficients: Correlation may be regarded as a "rough measure" of the degree of responsiveness of quantity sold to various prices charged. It should be noted, however, that high correlations are not always indicative of a causal relationship, since other excluded factors may also have an influence. Correlation coefficients will be quoted in the text and due care should therefore be taken in their interpretation.

- Variability in quantity purchased and the relative price of the product under consideration: The use of coefficients of variation for both relative price and quantity purchased renders it possible to gain an idea of price elasticity. Should the deflated relative price per kilogram vary to a greater extent than that of the number of kilogrammes per purchase, it tends to indicate that the product has a relatively inelastic demand (and visa versa).

- Price elasticities of demand were also calculated for the products using multiple regression techniques. The multiple regression functions are of the form:

\[ Y_t = \beta_0 + \beta_1 X_{1t} + \beta_2 X_{2t} + \beta_3 X_{3t} + \beta_4 X_{4t} + \phi \]

where

- \( Y_t \) = consumption (relative market share) of either maize meal, potatoes, bread or rice
- \( X_{1t} \) = relative price of maize meal, potatoes, bread and rice
- \( \phi \) = error or distribution term.

Best-fit equations and coefficients were selected according to a variety of measures. The various statistical tests were combined with the test of logic to obtain meaningful results.
Table 1: The number of kilograms per purchase, the price per kilogram, the total revenue spent and the total quantity purchased over a 15-month period

<table>
<thead>
<tr>
<th></th>
<th>Instant</th>
<th>Bread</th>
<th>Pasta</th>
<th>Potatoes</th>
<th>Rice</th>
<th>Maize meal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average mass per purchase (kg)</td>
<td>0,517</td>
<td>0,620</td>
<td>0,475</td>
<td>6,083</td>
<td>1,983</td>
<td>3,565</td>
</tr>
<tr>
<td>CV (%)</td>
<td>1,74%</td>
<td>2,58%</td>
<td>5,48%</td>
<td>21,84%</td>
<td>14,55%</td>
<td>2,00%</td>
</tr>
<tr>
<td>Price per kg R/kg</td>
<td>6,89</td>
<td>1,57</td>
<td>4,28</td>
<td>0,63</td>
<td>2,04</td>
<td>1,00</td>
</tr>
<tr>
<td>CV (%)</td>
<td>7,52%</td>
<td>4,24%</td>
<td>5,66%</td>
<td>38,40%</td>
<td>12,34%</td>
<td>5,95%</td>
</tr>
<tr>
<td>Deflated relative price per kg (R/kg)</td>
<td>55,75</td>
<td>8,87</td>
<td>28,72</td>
<td>3,31</td>
<td>11,86</td>
<td>5,13</td>
</tr>
<tr>
<td>CV (%)</td>
<td>3,91%</td>
<td>3,93%</td>
<td>7,27%</td>
<td>33,39%</td>
<td>8,71%</td>
<td>4,23%</td>
</tr>
<tr>
<td>Average revenue spent per month (R)</td>
<td>348 641</td>
<td>633 099</td>
<td>109 636</td>
<td>168 993</td>
<td>354 989</td>
<td>156 425</td>
</tr>
<tr>
<td>CV (%)</td>
<td>53,48%</td>
<td>42,62%</td>
<td>51,07%</td>
<td>45,24%</td>
<td>52,84%</td>
<td>55,40%</td>
</tr>
<tr>
<td>Average quantity purchased per month (kg)</td>
<td>49 449</td>
<td>401 366</td>
<td>25 375</td>
<td>289 050</td>
<td>169 228</td>
<td>163 557</td>
</tr>
<tr>
<td>CV (%)</td>
<td>47,31%</td>
<td>40,01%</td>
<td>48,01%</td>
<td>45,57%</td>
<td>46,63%</td>
<td>50,94%</td>
</tr>
</tbody>
</table>

1 The deflated price of the carbohydrate is the price deflated by the food price index (base month = November 1988). The deflated relative price of the carbohydrate is, for example, the deflated maize meal price divided by the sum of all of the carbohydrate product prices.

In addition to the above techniques, visual representations in Figures 2 to 5 give an idea of how consumption reacts to changes in the retail price of bread, maize meal, rice and potatoes, respectively. Table 1 shows the average kilograms per purchase, the price per kilogram, the total revenue spent and the total quantity purchased over the 15 month period.

3.1 Bread

The bread price includes all bread products such as bread rolls, high protein loaves, white and brown bread. The retail bread price was deflated using the food price index with 1985 as the base year. Figure 2 shows the quantity of bread purchased and real bread price. The real bread price declined whilst purchases moved sideways in a range between 4,1 and 5,4 tons since February 1989. There appears to be a degree of responsiveness to price hikes throughout most of the period under consideration.

The correlation between real bread price and the quantity purchased was -0,61. The magnitude of the correlation coefficient indicates a fairly strong negative relationship between price and quantity (p = 0,0001). The degree of sensitivity in quantity demanded in response to price changes therefore appears to be fairly high.

Contrary to what the correlation coefficient suggests, the deflated relative price per kilogram bread varied to a greater extent than that of the number of kilograms purchased, thereby indicating a relatively inelastic demand for the product. However, the price elasticity of demand for bread was calculated at -1,30 (p = 0,092) which indicates that the demand for bread is relatively price elastic. It is interesting to note that the bread price was in a local trough in May 1989, which coincided with an increase in the maize price.

3.2 Maize Products

Real retail maize meal prices in supermarkets are relatively constant (CV = 4%). The relatively constant retail price shown by chain stores supports findings obtained in the retail gross margin studies which are conducted annually by the Maize Board.

The quantity of maize products purchased was found to be relatively insensitive to these small price changes. The maize price has been increased in May of each year. The effect of increases in the raw material price is seen to have taken effect in supermarket retail prices in May and June. A drop in sales was also experienced in these months.

Figure 2: The deflated bread price versus the quantity of bread demanded

This effect was, however, short-lived as sales in July showed a recovery (Figure 3), which appears to confirm the notion that human consumption of maize meal is relatively price inelastic. Evidence of a peak in purchases in April 1989 may be ascribed to the "Maize Generation Music Sensation" promotion campaign, in conjunction with relatively low prices. An interesting phenomenon is however the timing of the Maize Generation campaign. Logic suggests that far more mileage would be gained from advertising expenditure were the advertising launched so as to follow a price increase and not to precede it. The correlation coefficient of the real price of maize products and quantity of maize products consumed is -0,33.
Figure 3: The deflated maize meal price versus the quantity of maize meal demanded

The magnitude of the correlation coefficient is low and was found to be non-significant \( p=0.2317 \), thus showing a weak relationship between price and quantity.

The non-significant coefficient tends to support the a priori expectation that human consumption of white maize has a low price elasticity of demand. Furthermore, maize meal is similar to bread, in that the deflated relative price per kilogram varied to a greater extent than that of the number of kilograms per purchase, thereby indicating an inelastic demand for the product.

Regression analyses estimated the price elasticity of demand for maize meal in urban areas at \(-0.699 (p=0.0001)\) showing that for every 10% rise in the real maize meal price there is a 6.99% drop in purchases of maize meal.

Hence the demand for rice may be considered to be relatively elastic. Furthermore, rice showed a high degree of variability in both relative price and quantity purchased with CV's being 8.71% and 14.55% respectively. Fluctuations in quantity are higher than those in price, indicating support for the notion that the demand for rice is relatively elastic. These results demonstrate the unreliability of the correlation coefficient and supports previous comments that it should be treated with caution.

A trough in rice prices coincided with an increase in the maize price in May. The further maize price increase of October appears to have been "anticipated" by the rice industry as rice prices were increased up to that point in time, only to decline thereafter. Movements in the rice price appear to be timed in such a way as to be part of a competitive marketing strategy. A highly significant correlation \( (0.89) \) between real rice and maize meal prices confirm this observation. For the maize industry this implies that maize prices should rise over time at a slower pace rather than stepwise at a specific time, e.g. May. Rice purchases show a slight festive season peak in response to a decline in price for that month.

3.4 Potatoes

Graphically potatoes appear to be the most price sensitive carbohydrate product. Figure 5 clearly indicates that the quantity purchased and deflated price are inversely related. The correlation exhibits a negative relationship between price and quantity with a coefficient of \(-0.50 (p=0.0325)\).

Fluctuations in the mass \( (CV=21.84\%) \) and the relative price \( (CV=33.4\%) \) of potatoes are the highest of all of the carbohydrate products. Since the variability in quantity per purchase is lower than that of price, potatoes appear to be sensitive to price fluctuations.

The price elasticity of demand for potatoes was estimated at \(-0.54 (p=0.0001)\). The demand for potatoes is thus relatively price inelastic. This is in line with a priori expectations because potatoes are the cheapest carbohydrate (see Table 1).

Over supply caused potato prices to fall since the beginning of 1989 and the quantity of potatoes purchased rose steadily. In both June and September potato sales surpassed that of bread.
to gain the leading market share. September 1989 saw the turning point when this trend was reversed. No festive season peak was evident for potato consumption, most probably as a result of the increases in the real price.

Figure 5: The deflated potato price versus the quantity of potatoes demanded

Since the market does not have the potential to absorb an infinite supply of carbohydrates, maize products, bread and rice appear to lose a portion of the market to potatoes when potato prices are low (Figure 1). Once again, more data and a more in-depth analysis are needed to gain a better insight into these facets.

4. The correlation and cross price elasticity between certain carbohydrates

Correlations and cross price elasticities have to be interpreted with caution, because correlations only serve as an indication of a relationship between, say, price and quantity, but this is not a foregone conclusion. Data presented also pertain only to a 15-month period and therefore are not as representative as would be a larger data base (Table 1).

With this in mind, the correlation between the real rice price and the quantity of maize meal purchased is +0,53 (p=0,0214). This suggests that these two products are substitutes and that the cross elasticity between the price of potatoes and the consumption of maize meal is +0,302 (p=0,0001).

The highest average mass per purchase is that of potatoes (6,083kg), followed by maize meal (3,565 kg). Potatoes have a larger market share than maize meal in terms of the average quantity purchased and in terms of the average revenue spent per month. Potatoes are also the cheapest source of carbohydrate on a kilogram purchased basis (although prices appear to be on the increase). Since the average mass of potatoes per purchase is greater than that of maize products, this tends to suggest that in urban areas (at chain stores) the bulkiness of the product is not necessarily a drawback, provided the price is low (also see Table 1).

Instant cereal has the lowest CV (1,74%) indicating that mass per purchase is relatively constant. It is also the most expensive carbohydrate. Instant cereal exhibits an inelastic demand, with price fluctuating to a greater extent than does the quantity per purchase.

Bread is an interesting case in that it has one of the lowest masses per purchase, is the third cheapest source of carbohydrate on a per kilogram purchased basis, is the most perishable and yet earns the greatest average revenue. Such a result confirms that bread is acceptable to a wide range of urban consumers as being a convenient, "ready to eat" carbohydrate.

The rice price per kilogram is more than double that of maize meal and earns the second largest average revenue. Rice appears to enjoy a prestige product image.

5. Characteristics of maize meal consumers

It may be important to have a knowledge of the profile of a consumer of a certain product to facilitate market planning and segmentation. A combination of principal components and discriminant analysis techniques was used to determine the demographic characteristics of the average urban maize meal consumer. Scanning data, linked to the corresponding demographic information, was used in the analysis. The sample size comprised 2,697 individuals.

Discriminant analysis is a technique to statistically distinguish between two groups, for example those who purchase maize meal and those who don't. The method aims to maximise the separation of these groups by forming weighted linear combinations of explanatory variables, the latter being variables that measure the characteristics on which the groups are expected to differ, e.g. age, wealth and form of transportation used.

Discriminant functions are of the form:

\[ D = d_1 z_1 + d_2 z_2 + \ldots + d_p z_p \]

where

\[ D = \text{score on the discriminant function} \]

\[ d_i = \text{weighting coefficients} \]

\[ z_i = \text{standardized values of the discriminating variables (Klecka, 1975).} \]
The various statistical tests in conjunction with economic logic were employed in order to aid the selection of the "best" discriminating variables. As a check on the adequacy of the function, the original set of cases in known groups are reclassified so as to determine the percentage correctly classified.

Principal components have a number of uses, but are used here to:
(a) Reduce the number of variables being studied
(b) To convert a number of variables into an alternative form thereby overcoming severe multicollinearity.

Since there were a large number of demographic variables that were highly correlated, principal components were used so as to facilitate improved discriminant analyses.

The basic logic behind the component analysis is to extract a common dimension which is a weighted representation of the original variables.

Principal components are of the following form:

\[
PC_1 = a_1 x_1 + a_2 x_2 + \ldots + a_p x_p
\]

Where \(x_1, x_2, \ldots, x_p\) = original variables.

The coefficients \(a_1, a_2, \ldots, a_p\) are chosen such that the PC 1, the first principal component, accounts for the greatest possible share of the variance (or correlation) in the original \(p\) variables (Nieuwoudt, 1977). The correlation matrix and standardised variables were used since variables were measured in different units (Steffens, 1983).

A principal component was extracted as an indication of the wealth of the individual. The wealth of a consumer may be measured via several variables; those chosen include car ownership (CAR), an income of R2 001 or more per month (INC4), and whether or not the individual has a servant (SERVANT). As expected these variables were correlated (see Table 2).

The correlation problem was overcome by extracting a single "WEALTH INDEX" using principal components. Sixty-two percent of the variation in the data was explained by the wealth index which had an Eigenvalue of 1.86.

\[
WEALTH\ INDEX = 0.5738(INC4^*) + 0.5776(CAR^*) + 0.5806(SERVANT^*)
\]

where * = a standardised variate.

Table 2: Matrix of correlation coefficients of selected wealth variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>CAR</th>
<th>INC4</th>
<th>SERVANT</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAR</td>
<td>1.00</td>
<td>0.42**</td>
<td>0.44**</td>
</tr>
<tr>
<td>INC4</td>
<td>1.00</td>
<td>0.43**</td>
<td></td>
</tr>
<tr>
<td>SERVANT</td>
<td>1.00</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

** significant at the 1% level.

It should be noted that all of the latent vector loadings show a positive relationship with one another and are of similar magnitude, thereby implying a common association between the variables.

Approximately 95% of maize meal consumers are Black, whilst Whites are the second most important consumer group. Since there are demographic disparities between Blacks and Whites, separate analyses were conducted on these groups.

6.1 Black consumers of maize meal

The majority of urban Blacks tend to purchase the most of their maize meal on weekends at supermarkets within the townships (LHA, 1990). Although the data used in this analysis do include Soweto, it is biased toward chain stores outside of townships. Transportation of a bulky product such as maize meal could therefore present a problem.

In the analysis concerning Black individuals, the following available variables were selected by the stepwise procedure:

- WEALTH INDEX - an indication of the wealth of the individual;
- TAXI - whether or not the individual made use of taxi services;
- WALKS - whether the individual walks in order to get around;
- BUS/TRAIN - whether or not the individual made use of bus or train services; and
- AGE - an indication of the age of the individual.

The discriminant function shows a fair discriminatory power as indicated by Table 3. The function is capable of correctly classifying 84% of those individuals who purchase maize meal and 36% of those who do not. The group means of the discriminant variables are based on 1039 cases (Table 4).

Table 3: Measures of the discriminatory power of the discriminant function for Black individuals.

<table>
<thead>
<tr>
<th>Discriminating variable</th>
<th>Purchasers of maize meal (%)</th>
<th>Non-purchasers (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wealth index</td>
<td>84%</td>
<td>36%</td>
</tr>
<tr>
<td>Taxi</td>
<td>81,6</td>
<td></td>
</tr>
<tr>
<td>Walks</td>
<td>106,4</td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>42,8</td>
<td></td>
</tr>
<tr>
<td>Bus/Train user</td>
<td>21,3</td>
<td></td>
</tr>
</tbody>
</table>

Results indicate that amongst urban Blacks, those who purchase maize meal at urban chain stores are poor, tend to be older and tend to walk rather than use taxi or bus/train transport services. It should be borne in mind that these results are representative of urban chain stores, the majority of which are located outside of the townships. This implies that this is not necessarily representative of the global South African Black consumer of maize meal.

6.2 White consumers of maize meal

A similar analysis was undertaken for White individuals. Of the variables available the following two were selected by the stepwise procedure:

- WEALTH INDEX - an indication of the wealth of the individual; and
- AGE - an indication of the age of the individual.

The discriminant function shows a reasonable discriminatory power as indicated by Table 5. The function is capable of correctly classifying 74% of those individuals who purchase maize meal and 38% of those who do not purchase maize meal. The group means of the discriminant variables are based on 1071 cases (Table 6).
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Table 5: Measures of the discriminatory power of the discriminant function for white individuals

<table>
<thead>
<tr>
<th>Percentage of individuals in known groups correctly classified:</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Purchasers of maize meal (%)</td>
<td>74%</td>
<td></td>
</tr>
<tr>
<td>Non-purchasers (%)</td>
<td>38%</td>
<td></td>
</tr>
</tbody>
</table>

Table 6: Mean values of the discriminating variables for white consumers who purchased versus those that do not purchase maize meal

<table>
<thead>
<tr>
<th>Discriminating variable</th>
<th>Purchaser of maize meal</th>
<th>Non-purchaser of maize meal</th>
<th>Differance (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wealth index</td>
<td>1.366</td>
<td>0.996</td>
<td>37.1</td>
</tr>
<tr>
<td>Age</td>
<td>-0.281</td>
<td>-0.209</td>
<td>34.4</td>
</tr>
</tbody>
</table>

Results indicate that amongst urban Whites, those who purchase maize meal at urban chain stores tend to be more affluent and older than non-purchasers.

The results are interesting and confirm a priori expectations. Wealthy consumers purchasing maize meal also tend to have servants and their maize meal purchases are probably linked to this phenomenon. Taken further this type of information may be used so as to target promotions and other marketing strategies on those who make use of the product.

7. Conclusions

Scanning data are useful in forming a picture of trends within the urban market. As such it may be used so as to direct marketing efforts with greater accuracy and speed than previously possible.

The fact that data pertain only to chain stores is not considered to be a major shortcoming as the future trend will probably be towards the chain-store-type of shop, stocking a far wider variety of goods than in the past. It may however introduce bias and results should thus be treated with the necessary caution. In the maize meal market, urban data are valuable since with urbanisation, three quarters of the Black population, who are the major maize meal consumers, will be urbanised by the year 2010.

The following results were obtained:

- On average over a 15-month period maize products hold the fourth position in the urban market, in terms of quantity sold per month.
- Bread has the lion’s share of the market. The dominance of bread in the market place is possibly due to the fact that it is a form of convenience food that is consumed by all of South Africa’s race groups.
- Potatoes have the second largest market share which is possibly due to the low prices experienced as the result of an over supply. Whether or not potatoes will continue to hold their current position when prices increase is doubtful. Potato prices, and thus also consumption, appear to be supply driven. Potatoes, like maize meal, are bulky; however the analyses indicate that provided the price is low, the transportation problem appears to be negated.
- Rice is in third place despite its relatively high price. Rice is furthermore expected to gain market share at the expense of maize provided the industry (a) launches advertisements at the right time and (b) continues following a similar pricing strategy based on the timing of maize price increases. For the maize industry this implies that maize prices should rise at a slow pace over time, rather than stepwise at a specific time, e.g. May. Rice seems to have a luxury product image in the market for carbohydrates.

Black purchasers of maize meal who shop at urban chain stores tend to be less affluent, older and tend to walk rather than use taxi or bus/train transport.

In general, analyses have indicated that two factors are of cardinal importance in the market for carbohydrates, namely relative prices and convenience (i.e. “ready to eat” and bulkliness).

White purchasers of maize meal are wealthier and older than non-consumers. This group also tends to have servants which may explain this phenomenon.

Whilst still in its infancy, results similar to those gained from this study should improve in future as more data become available and results become more reliable. Current analyses are based on data pertaining only to a 15-month period. Results are unique and interesting and can be applied to aid in policy decision-making, albeit with the necessary caution. The following policy implications highlight the usefulness of scanning to a marketing organisation:

- From the results obtained it would appear that maize products and bread are less sensitive to price changes than are rice and potatoes. An estimate of the price elasticity of demand for maize meal in urban areas is -0.699. Using this estimate the effect of a proposed maize price increase which is passed on to consumers (ceteris paribus), the net effect on urban consumption may be calculated.
- The 1989 “Maize Generation Music Sensation” advertising campaign appears to have had a positive effect on purchases. The duration of this effect was limited by the raw product price increase shortly after the campaign.
- The phasing out of government subsidies in the bread industry takes effect in March 1991. This could increase the price of bread relative to other products and render these substitutes more attractive to consumers. In urban areas where the responsiveness of the quantity consumed to changes in the relative price of bread tends to be elastic, a move away from bread could be expected in these areas.
- The maize industry has undergone a gradual withdrawal of government subsidies over the past few years, hence the effect of government subsidy withdrawal will be of minor magnitude. As such maize will have a decided advantage relative to bread. This comparative advantage may be capitalised upon by the maize industry.
- In order to counter a competitive pricing strategy followed by rice, maize prices should rise at a slow pace over time, rather than stepwise at a specific time, e.g. May.
- With prior knowledge of the characteristics of both Black and White consumers, the design and pitch of advertising campaigns may be improved. Future campaigns should take these findings into account.

Bar code scanning is an efficient and timely source of data, being available monthly, weekly or even daily. It's capabilities include the direct coupling of purchase data to a consumer profile. Whilst bar code scanning provides an up to date and
accurate indication of the purchasers of a product, there are certain limitations which vary depending on the product marketed and the major retail outlets used for the sale of that product. It may however be argued that under certain circumstances, bar code scanning can be extremely cost effective.

Whilst the system is more representative of chain stores in White urban areas, the expansion of computer networks may cause the spread of retailers participating in the system to expand overtime. As a tool for more accurate, timely and informed marketing decisions, bar code scanning has tremendous potential in improving marketing to the Southern African consumer of the 1990's.

Notes

1. This article is based on a DSc (Agric) thesis by Mike Elliott in the Department of Agricultural Economics at the University of Pretoria. The authors want to thank Prof Jan Groenewald for numerous suggestions.

2. AMPS refers to All Media Product Survey and is regarded as being the stratification standard within South Africa.

References


