INTRODUCTION
Consumer Diary Panels first appeared about forty years ago - the Industrial Surveys Company (now the Market Research Corporation of America) established a national consumer panel in the United States of 2,000 families in October 1941. The Canadian Panel of Canada was established in 1946, while the British Consumer Panel was established in Great Britain in 1949.

The introduction of consumer panels, their use by marketing companies has increased rapidly. Panels have been established in a number of countries, in addition to standard brand shares, data, a wide array of special analyses such as brand loyalty and switching, extent of heavy buying and the measurement of the success of the launch of new brands.

COLLECTION OF PURCHASING INFORMATION BY DIARY
Panel members in North America record details of their purchases in a diary which has a separate section for each product purchased. In order to allow for specific requirements in individual product fields.

An index is included in the front of the diary so as to assist the person filling in the diary in locating the page on which the required entry is positioned. The person filling in the diary is asked to look through the diary at the end of the reporting period to tick where appropriate a non-bought square.

Some diary panels have been established for which the diary is delivered to and collected from the household, rather than using the mail. This provides an opportunity for the panel operator to check whether the diary has been completed correctly.

Direct validation of diary completion is very difficult. Rando calls can be carried out during the week of completion to determine whether the diary has been completed up to the time of call. However, they generally also the peak shopping expeditions which take place on Friday and Saturday. Monthly calls were used for a while on the Aldwood Consumer Panel, housed in Great Britain.

The amount of purchasing missed was found to be fairly small, mainly in quickly consumed categories. "Pantry Check" where items in store are numbers on a five-week scale (0 to 5) are subject to a more accurate validation of diary completion.

The reporting level for product fields included in a diary has been discussed (Shayenberg, (1)). In terms of the number of product categories included in the diary, the study carried out in the United States showed that a 50% increase in the number of product fields on the diary did not alter the reporting levels of the existing fields. The effect of diary entry position was discussed by Sudaen (2). He showed that reporting level was lower in the middle pages of the diary. Also, reporting level was lower for product categories with more complex entries, that is with more check-boxes.

NON-DIARY DATA COLLECTION
A rather different method of collecting purchasing information was developed in Great Britain during the mid-sixties by Audits of Retailers. Households were asked to record items purchased during the previous week. Advantages were claimed for this system including better reporting of special offers. However, there was the possibility of unpleasant wrappers and the possibility of personal items (such as analogues) being carried around by the user.

Although diary completion was eliminated, the interviewer was required to proceed through a book of product categories in a systematic fashion. The interviewer was required to search the house for unopened or partly used packages, however, this could become less diligent towards the end of the list or in a disorganised household.

The AGF system is not immune to the problem of sales estimates for products differing from direct shipments. In a paper given at the ESOMAR Seminar on Panels in Lucerne, Lougly (3) showed data on reporting of a brand of biscuits fall away when the type of wrapper was altered from cardboard to cellophane.

ADVENT OF UNIVERSAL CODING
The introduction of Universal Product Codes (UPC's) or Article Numbering has created a completely new set of possibilities as far as data collection is concerned. A comprehensive survey of the data available was included in a special report on Test Marketing included in Advertising Age (4).

The Universal Product Code consists of a series of bars on a package which identifies to an electronic reader the product, size and manufacturer of the product in the article in question. The combinations of bars and spaces signify different numbers which are read off under the code. At the checkout, the package is pulled across the scanner window to feed the information into a mini-computer. This then looks up the price of the item on disk and prints on the check-out register, the item, name, and price.

A number of panels are available in the United States which make use of this scanning technology. A sample of households who use scanner stores are selected and provided with cards (one for each household member) which are readable by the scanning equipment. At each shopping visit to the store the panel member presents the special panel identification card. This alerts the casher to activate the Scanner System so that all of the panel member's purchases are instantly recorded on a Computer File.

While this general methodology is consistent across the various scanner panels, there are major differences in the way the panels are structured. No company so far has developed a sample of shoppers that is representative of shoppers on a total U.S. basis or even a regional basis. The use of scanner panels has, therefore, been confined to use in market research for specific categories within stores.

In the United States, Scott's scan panels are comprised of a scanner in the store which scans and records the product passed through the check-out. The product name and price are then printed on a paper slip which accompanies the shopper to the checkout. The scanner in the store, which is not a part of the scanner in the store, then checks the scanner price in a database of the store.

In contrast to the BehaviourScan approach, there are two other Scanner Panel services available in the United States which rely on an independent number of stores. The Test Marketing Group's, ScanPan operates in 3 cities: Minneapolis, St. Paul, and St. Louis. Another service is in Orlando, Florida. Tele-Research Item Movement Inc. (TRIM) operates in St. Louis and Los Angeles. The ScanPan panel uses in every store TRIM developed in both St. Louis and Los Angeles.

In Canada the only scanning service currently operating is the Nielsen Electronic Diary Service which is based upon a panel of 2,000 households shopping at 9 stores with ScanPan in Metro Toronto.

USE OF SCANNER PANELS
The possibility exists for obtaining a wide range of data concerning the purchases made by those households at which purchases are made compared with conventional Consumer Panels. In fact the vast quantities of rich data available can be lead to analytical indigestion and, misinterpretation if the nature of the universe from which the sample shoppers is drawn is not taken into account.

Unique data are available in that for each purchase made, it is possible to identify the price relative to other brands available is obtainable. With the possibility of varying the price of the test brand as required, purchasing levels of a new brand can be related to a controlled range of relative prices.

Scanner data are capable of revealing the effect of variation in a marketing variables over short time periods on the market share of a new brand. For example, Brand Shares can be tracked weekly to show the effect of coupons, in-store features and advertising together with the effects of competitive activity.

ADVANTAGES AND DISADVANTAGES OF SCANNER PANELS
Advantages claimed for Scanner Panels include:

Reduced Panel Member Household
The only activity required of a panel member is the showing of an I.D. card to the cashier. This is claimed to lead to more efficient recruitment, better representation of certain demographic segments and a dramatic reduction of Panel drop-out rates.
Instantaneous Computerised Data Generation

Data relating to products purchased by the panel member are instantaneously recorded on computer files by the Scanner systems at the time of purchase. This is claimed to lead to:

(i) Complete Product Category Coverage - All product categories which contain U.P.C. coding will be tracked - not just product fields which are specified in a diary at a particular point in time.

(ii) Exact Brand-Head Product Detail.

(iii) Elimination of memory bias which might result when diaries are completed.

(iv) Availability of data shortly after purchase transactions.

(v) Increased ability to conduct tests of promotions, coupons, etc.

On the other side of the coin, Scanner data will have disadvantages as follows:

Breakdown of Scanner Equipment

In small stores a breakdown of Scanner equipment can seriously compromise sample designs involving price changes, promotions etc.

Store Irregularities

Problems can arise when the check-out operator does not act in accordance with management requirements, for example:

- Failure to pass each package over scanner - when for example six packages of various flavours are purchased each at the same price, one of the packages may be passed over scanner as representative of the six packages of different flavours.

- Packages of unidentifiable sizes may not be passed through equipment.

Inaccurate Data

- The U.P.C. code may not in all cases be detailed enough to enable sufficient discrimination within product fields.

- The scanner U.P.C. code may be used for more than one sub-category.

- No U.P.C. code on the package.

Are Scanner Panels Representative?

By the end of 1982, over 6,000 (accounting for 29% of All Cosmo idy Volume) stores in the United States were using Scanner equipment. By 1985 it is expected that more than half of the United States food sales will be recorded on Scanners. In Canada at the end of 1982 there were under 300 stores with scanner equipment accounting for less than 10% of All Cosmo idy Volume. It will therefore be some time before panels representative of all purchases made by households will be feasible in the United States and even longer in Canada.

The BehaviorScan panels would appear to represent almost all purchases made in the town in which the panels are established although purchases made outside the area covered by the stores will not be collected. The other Scanner panels are recruited from shoppers who made a high proportion of their purchases at the Scanner stores from which the panels were recruited.

The requirement of high loyalty to individual outlets has been investigated both to determine the percentage of households that would be eligible and also whether the eligible households are likely to be representative of the shopping universe.

The first investigation, carried out by N.P.D. Research, Inc., New York, consists of a comparison of the purchasing behavior of, families, who are single-store shoppers with shoppers at more than one store, with data collected by Andrew Tarshis in Marketing News (3).

An analysis was made of six months data provided by 1,000 households in 20 product categories. Division of households and volume by stores used was as follows:

<table>
<thead>
<tr>
<th>Stores</th>
<th>Households</th>
<th>Volume</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>10%</td>
<td>8%</td>
</tr>
<tr>
<td>2-3</td>
<td>50%</td>
<td>67%</td>
</tr>
<tr>
<td>4 and over</td>
<td>40%</td>
<td>45%</td>
</tr>
</tbody>
</table>

In terms of demographic characteristics, single-store buyers were less educated and had a lower income than multiple-store shoppers. Single-store shoppers were less 'useful' people than multiple-store shoppers. While single store shoppers made 24% of their purchases at one store and multiple-store shoppers made 32% of their purchases on deal. Also, single-store shoppers bought relatively less private-label brands and made more purchases of the few top brands than multiple-store shoppers.

In the second investigation an analysis was made of the distribution of purchases (for Ontario) in the 70 product categories contained in the E.L. International Survey Ltd., Canada Grocery Shopping Basket. The 70 categories include all the major packaged products available in grocery outlets. Purchases in January 1983 were analysed by expenditure classes or product outlets. The following table shows the breakdown of households and expenditure by the highest percentage spent at any named outlet.

<table>
<thead>
<tr>
<th>Highest Percentage of Expenditure</th>
<th>Expenditure ($)</th>
<th>HI (%)</th>
<th>Average Dollars Per Month</th>
</tr>
</thead>
<tbody>
<tr>
<td>100%</td>
<td>8.9</td>
<td>13.3</td>
<td>31.9</td>
</tr>
<tr>
<td>91-99</td>
<td>10.9</td>
<td>9.6</td>
<td>87.5</td>
</tr>
<tr>
<td>81-90</td>
<td>11.5</td>
<td>12.1</td>
<td>73.6</td>
</tr>
<tr>
<td>71-80</td>
<td>11.6</td>
<td>11.0</td>
<td>82.2</td>
</tr>
<tr>
<td>61-70</td>
<td>15.2</td>
<td>14.5</td>
<td>81.6</td>
</tr>
<tr>
<td>51-60</td>
<td>16.9</td>
<td>16.5</td>
<td>79.7</td>
</tr>
<tr>
<td>Under 50</td>
<td>25.0</td>
<td>23.0</td>
<td>85.0</td>
</tr>
</tbody>
</table>

These data show that for households in Ontario, only 13.3% were 100% loyal to any one named outlet. Also these 100% loyal shoppers spent on average $31.9 compared with the average expenditure of $87.5 and 9.6. as such unrepresentative of all households in terms of grocery expenditure.

The table also shows that a substantial proportion of expenditure was accounted for by households who did not display a high loyalty to any one named outlet. This 25% of expenditure was accounted for by households who made less than half of their purchases at any one named outlet, while 51% of expenditure was accounted for by households who spent 70% or less of their expenditure on shopping basket categories at any one named outlet.

The analysis concluded: finding that a panel restricted to households who are highly loyal to a single outlet is unlikely to be representative of the household universe.

The Future

Collection of scanner data from individual stores will provide untold masses of purchasing data which will need to be digested. Data that will be available in quantity for the first time includes:

(a) Time of day at which purchases are made. This will influence the extent to which television time in the breakfast and lunch spots will be cost-effective.

(b) Availability and prices of other brands.

Analysts could be carried out showing the differential between the price of a purchase and other brands in the product category on sale.

Measures of price elasticity will be available based on aggregated data. The use of Scanner data will enable the change in own-brand elasticity to be tracked over time and should enable more sensitive measures of own-brand elasticity to be produced compared with the methods currently used which involve the analysis of monthly brand share and monthly average prices.

The next stage in the use of U.P.C. data will result when the household can transmit details of purchase electronically. The U.P.C. code would be scanned in store by an 'electronic pencil'. A system has been already developed and patented by N.P.C. Research Inc., Fort Washington, New York.

Each panel member would be provided with an electronic storage device with a keyboard and to which is attached an electronic wand. For each purchase data is entered at the wand and the wand is then inserted into the device. The data is then transmitted via a telephone handset to a central computer. Thus, the progress of new brands will be monitored quickly on a representative sample of households based on purchase made at all outlets, not only those with scanning equipment.

Conclusions

Scanner panels will serve different purposes from diary panels.

Concentration on small numbers of stores provides ability to understand environment, but at risk of representativeness.

They may be good for test markets but will not be projectable nationally.

Therefore, although many of the analyses they provide are similar, they are not as yet likely to supersede national diary panels, such as the MRCA and N.P.D. Research panels in the United States and the Consumer Panel of Canada.

Scanning technology through portable 'electronic pencil' sensors may provide the next generation of diary panels.

References

1. Eberberg A.S. 1967

2. Sudman S. 1964

3. Tarshis A.M. 1980

4. Advertising Age 1983

5. 'Scanners Panels Are Hot 'Typical' 'Marketing News, May 16

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