13 Sampling

What is a sample?

Sometimes a business or market research organisation may be able to carry out market research by means of a **survey** of all its target POPULATION. The **target population** is those people whose views it wants to find out. For example, a business making components might only supply five companies with parts. So it should be fairly easy to survey all of its customers. But in most cases it is impractical to survey the whole population. It would take too long and would be too costly to gather and process the information.

Instead, researchers take a sample of the population. Samples should be REPRESENTATIVE. They should have the same characteristics as the whole population. If they don't, results from the sample which are generalised to the whole population may be inaccurate. For example, a survey may be carried out by a food company to find out how many people would buy a new, up-market product. If it only asked pensioners on low incomes, it would almost certainly find that the survey predicted fewer sales than would actually be the case. This is because the sample chosen did not accurately reflect the whole population. In this case SAMPLING BIAS is present. **Questionnaires** are often used to gather data from a sample.

Question 1.

A pharmaceutical (drugs) company wanted to commission a study on male health worldwide. The results would be used to make major marketing decisions. A market research agency was commissioned to carry out the study. It set about conducting a two phase research project using survey techniques. In the first phase, 20,000 interviews were completed with target respondents in eight countries. A combination of phone and web interviewing was used. In the second phase, a random selection of about 5 per cent of the initial respondents for participation in a second interview were identified. These interviews were conducted on the Internet for those with access or through the use of a paper questionnaire.

The research methods used meant that the same questions were put to all respondents and answers collated in the same manner.

(a) Explain the type of sampling method used by the business.
(b) The market research agency interviewed 20,000 males in eight countries. Suggest why it interviewed (i) males only; (ii) respondents in eight countries rather than one country only and (iii) 20,000 people rather than 1,000 or 500,000.
(c) How much statistical bias would you expect to see in the findings from this research?

Size of sample

The SAMPLE SIZE will influence how representative the sample is of the population. Larger samples tend to be more representative. For example, say that the target population is 10,000 customers. If the sample were the same size as the target population, 10,000, it would be totally representative. A sample of 9,000 people is more likely to reflect the characteristics of the target population than 10 people surveyed on the street. So decisions based on the results of the larger sample are more likely to be accurate. There is a number of ways in which a sample can be chosen.

Type of sample

There are different types of sample and sampling methods that can be used by a business carrying out primary research.

Random sampling RANDOM SAMPLING gives each member of a group an equal chance of being chosen. In other words, the sample is selected at random, rather like picking numbers out of a hat. Today computers can be used to produce a random list of numbers, which are then used as the basis for selecting a sample. The main advantage of random sampling is that bias cannot be introduced when choosing the sample. However, it assumes that all members of the group are the same (homogeneous), which is not always the case. A small sample chosen in this way may not have the characteristics of the population, so a very large sample would have to be taken to make sure it was representative. It would be very costly and time consuming for firms to draw up a list of the whole population and then contact and interview them.

Systematic sampling One method sometimes used to reduce the time taken to locate a random sample is to choose every tenth or twentieth name on a list. This is known as SYSTEMATIC SAMPLING. It is, however, less random.

Stratified random sampling This method of sampling is also random. However, unlike the types of random sampling described above, STRATFIED RANDOM SAMPLING is where the sample is divided into **segments** or **strata** based on previous knowledge about how the population is divided up. For example, a business may be interested in how employment

status affected the demand for a food product. It might divide the population up into different income groups, such as higher managerial and professional occupations, small employers and 'own account' workers etc. A random sample could then be chosen from each of these groups, making sure that there were the same proportions of the sample in each category as in the population as a whole. Therefore, if the population had 10 per cent upper class males, so would the sample. Stratified sampling is often preferred by researchers as it makes the sample more representative of the whole group and is less likely to privilege particular sub-groups than random sampling.

Quota sampling QUOTA SAMPLING involves the population being segmented into a number of groups which share specific characteristics. These may be based on the age and sex of the population. Interviewers are then given targets for the number of people out of each segment who they must interview. For example, an interviewer may be asked to interview 10 males between the ages of 18 and 25, or 15 females between the ages of 45 and 60. Once the target is reached, no more people are interviewed from that group. The advantage of this sampling method is that it can be cheaper to operate than many of the others. It is also useful where the proportions of different groups within the population are known. However, results from quota sampling are not statistically representative of the population and are not randomly chosen.

Snowballing SNOWBALLING is a highly specialised method of sampling. It involves starting the process of sampling with one individual or group and then using these contacts to develop more, hence the 'snowball' effect. This is only used when other sampling methods are not possible, due to the fact that samples built up by snowballing cannot be representative. Businesses operating in highly secretive markets, such as the arms trade, may use this method of sampling. Similarly, firms engaged in producing highly specialised and expensive one-off products for a very limited range of customers may need to rely upon snowballing when engaged in marketing research. Examples might include firms engaged in the nuclear and power generating industries.

Cluster sampling CLUSTER SAMPLING involves separating the population into 'clusters', usually in different geographical areas. A random sample is then taken from the clusters, which are assumed to be representative of the population. This method is often used when survey results need to be found quickly, such as in opinion polls.

Multi-stage sampling This involves selecting one sample from another sample. So, for example, a market researcher might choose a county at random and then a district of that county may be selected. Similarly, a street within a city may be chosen and then a particular household within a street.

Factors affecting the sampling method and size of sample

Businesses will take account of a number of key factors when making their choice as to which sampling method to deploy:

Finance available For some small businesses this means that random sampling can be beyond their means. Larger businesses, however, may have the resources to undertake market research methods that give more random results and use larger sample sizes.

The nature of the product The nature of a product produced by a business can affect the sampling method chosen during market research. This relates, in particular, to whether a product is the same for all consumers (uniform) or carefully adapted to meet the needs of individual consumers or very small groups of consumers (bespoke). For products that are uniform, a business will need to ensure that all of the population are properly represented in a sample and will need to ensure that little or no statistical bias is introduced in the sample. This is likely to mean a relatively large sample size. For products that are 'one-offs', bespoke or made to order, the population is likely to be very small or confined to just one person or business. In this case sampling is likely to be very straightforward and rely upon a relatively small sample, without the accompanying need for

Question 2.

Graham Hunter is a farmer in Cambridgeshire, producing a range of vegetables. All of his supplies go to three large supermarket chains and he and his farm have been featured on the packaging at one of these supermarkets. In making decisions about what vegetables to grow in the forthcoming year, Graham has decided to undertake some market research. His research will be based upon speaking to the Head Buyer at each of these supermarkets and asking their opinions.

(a) Explain why Graham Hunter can be said to have used a sample.

(b) Explain TWO factors that may have influence Graham's choice of sample.

(c) How reliable do you think the results of his research might be?

Question 3.

DPX is a market research company. In 2003, it completed a report for a manufacturer of building materials and fittings which had seen an unexpected fall in sales over the previous 12 months. The manufacturer wanted to find out how its immediate customers, DIY chains such as B&Q and Wickes, and the larger number of builders' and plumbers' merchants, viewed its products. For example, it wanted to find out whether customers saw its products as giving value for money compared to those of competitors, whether the fittings were reliable and whether the range of products was large enough. It also wanted information about sales and profits of rival businesses to see if they had experienced a similar downturn.

DPX devised a telephone questionnaire for customers. In its sample, it interviewed all the large DIY chains. But it only conducted 30 interviews with smaller builders' and plumbers' merchants. The sample of 30 was judged to be representative of all smaller builders' and plumbers' merchants and a 95 per cent confidence level was given for the responses.

The research showed that a major rival company had completely updated its range over the previous 24 months. The products of the manufacturing company commissioning the research had lost competitiveness as a result. For example, they were said by respondents to be giving less good value for money than before.

(a) Explain what is meant by 'a 95 per cent confidence level was given for the responses' from the smaller plumbers' and builders' merchants.

(b) How might the business reduce the chance that its results did not reflect the views of all small builders and plumbers' merchants?

(c) Discuss ONE strategy the manufacturing company might develop to reverse the decline in its sales.

sophisticated sampling techniques such as those described above.

The risk involved The greater a risk a business is taking, the more reliable it would like its results to be. Thus a business taking a large risks for example financially, or in terms of the business's future survival, would want to use the most reliable and sophisticated sampling method available to it. This would for many businesses mean a relatively larger sample size. It would reduce the risk of statistical bias and increase the reliability of the findings from the sample. By way of contrast, a business taking a small risk might be prepared to go ahead with less reliable and, possibly, informal sampling methods such as talking to a few customers. A small ice cream business that has one shop, for example, might introduce a new flavour of ice cream after asking the views of, or in response to requests from, just a few customers. If the new flavour doesn't prove popular with customers, it could be rapidly withdrawn and replaced by another. Little would be lost by the business. A large ice cream manufacturer, on the other hand, selling products to millions of customers, would be unlikely to change its production processes on the basis of such a small sample. This is because the risk associated with a wrong decision would be so great.

The target market The nature of a product's target market will influence the sampling undertaken as part of market research. For example, if there is a small target market for a product, then the sample chosen will be smaller. Similarly, if the characteristics of a products' target market are similar or the same and they are in a particular market segment, then this will influence the sampling method. In such cases businesses may use cluster or quota sampling. For products aimed at mass markets with a range of consumers, the sampling methods chosen will need to reflect this diversity and this is likely to mean a larger sample size.

Sample results and statistical significance

The only way to get an accurate picture of a population is to have all relevant data about that population. But this takes time and is expensive. So researchers take a sample and the results obtained from the sample are then applied to the whole population. But how confident can a business be about the results of such a survey? When analysing data from a sample, researchers are interested in certain statistics.

- The mean. This is the average result For example, the average amount spent on a Monday by a shopper may be £10. On Saturday it may be £20.
- The STANDARD DEVIATION. This tells researchers about the spread of results. Standard deviation measures the average difference (deviation) of each item of data from the mean. For example, the standard deviation from the average amount spent may be £2 on Monday and £5 on Saturday. Comparing the means shows that shoppers spent