Market research development/Presentation of data

Market research developments

Businesses are increasingly turning electronic means to gather data: Such as?

'Loyalty cards' offer:

Cost effectiveness of market research:

Marketing is not free. Even secondary research takes time and buying market research reports or undertaking primary research can be very expensive.

The internet and mobile phones (especially smartphones) have made it much **easier** to contact a very wide range of potential customers (e.g. text messages)

- **Online marketing**
- The cell-phone method of surveys can use pre-recorded messages and questions

Is market research worth it? Difficult to assess but well-designed and focused market research can indeed pay for itself in higher sales and profits.

Global spending on market research continues to increase…

What happens to the results?

Market research ***p_____s*** *VAST amounts of data, in both numerate (quantitative) and descriptive form (qualitative). These data (plural) are said to be 'RAW' and unprocessed because they have not been presented or analysed in ways that will assist the business. Once these stages have been undertaken, the* ***RAW DATA*** *become* ***'information'*** *that can be used.*

Presentation of data

Numerate data might be presented in the form of a **table**:

- *Allows ease of reference and present a mass data in a precise way*
- *However, they lack visual impact of a graph or chart*

Sales data for the last 6 months	$m
Month	
1	230
2	250
3	290
4	300
5	350
6	320

Table 15.4 Example of presentation of numerate data

Bar charts are one of the most frequently used forms of presenting data. They use **BANDS** of **equal** width but of varying length and height

- Easy comparison over time or between different items

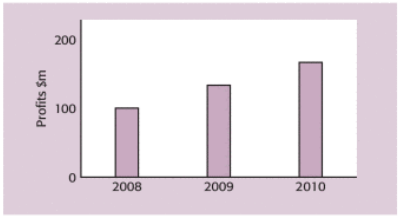

Figure 15.1 Simple bar chart

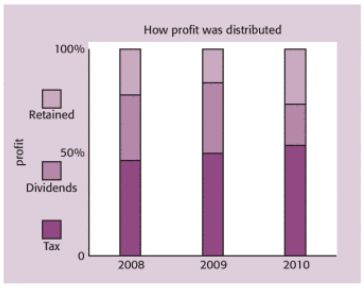

Figure 15.2 Percentage bar chart

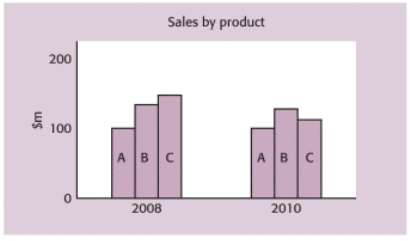

Figure 15.3 Component bar chart

Histograms are frequently **CONFUSED** with bar charts – HISTOGRAMS measure relative **FREQUENCIES** from grouped data

Petrol sales (2010)	
Number of litres	Number of consumers
1–10.99	100
11–20.99	200
21–30.99	260
31–40.99	180
41–60 (maximum)	120

Table 15.5 Frequency data for the amount of petrol bought by consumers

The first four class intervals are all of 10 litres. The last one is of 20 litres and therefore covers the area differently: it is wider and shorter (50%).

There are no gaps between the bars as data is measured continuously rather than separate.

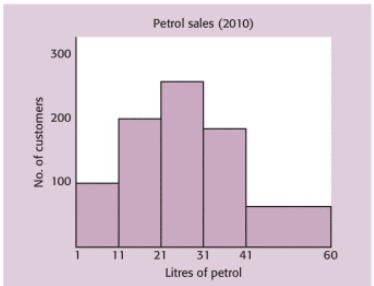

Figure 15.4 A histogram

Line graphs are most commonly used for showing changes in a **variable** over time-time-series graphs.

Draw the coordinates together to allow easy **reference** to **trends** in the data.

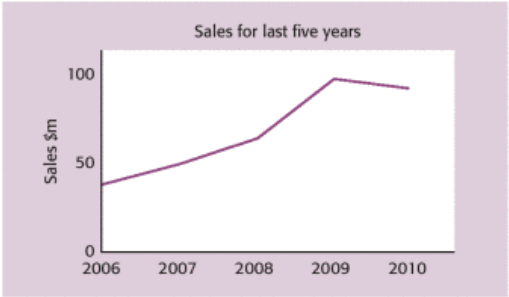

Figure 15.6 A line graph

Pie charts are used to display data that need to be presented in such as way that the proportions of the total are clearly shown.

- Each section of the pie shows how relatively significant the part of the data is of the whole.
- See if proportions have changed
-

Region	2010 Sales ($m)
South	300
North	260
West	400
East	640
Total country sales	**1,600**

The size of the section representing the sales of the West region is:

$$\frac{400}{1{,}600} \times 360 \text{ degrees} = 90 \text{ degrees}$$

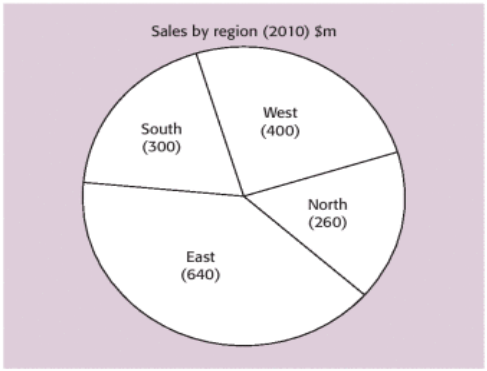

Figure 15.7 A pie chart

- Drawbacks are it doesn't allow for changes of the total size of the pie.
- Not so precise compared to others

Appropriateness of methods of presentation

Method of presentation	Most useful for
Tables	• when a wide range of results needs to be recorded • when the results need to be analysed by statistical means and it is essential to have the numbers themselves – it is generally more accurate to take results from a table than to interpret a graph or a chart • when there is a lot of text to include with the results, such as detailed headings for each column.
Line graphs	• when time is one of the variables • when the trend and regular variations need to be identified – this might be the first stage in undertaking sales forecasting, which can aid future decisions such as production and staffing levels • when two or more sets of time-series data need to be compared – for instance, when a competitor's sales are compared with a company's own performance.
Bar charts	• when the absolute size or magnitude of results needs to be presented and compared • when component and percentage component charts can be used to show how the total figure is comprised of different sections.
Pie charts	• visually useful to show the relative importance of sections or segments out of a total result – these can then be visually compared with other time periods • they are less effective when comparisons between totals are needed or when precise comparisons of segments over time are required.
Histograms	• These can be used to visually present frequency data when the range of the data has been broken into class ranges. They can be used for some simple statistical analysis such as identifying the modal class.
Pictograms	• Particularly useful when the user wants to attract the reader towards looking at the data – they are often rather imprecise when using one symbol to represent a large number of results.

Table 15.6 Methods of data presentation

Activity 15.5: Presenting data at ACM Ltd (p.279)

Analysing research results

	Number of hours per week
Last year	1, 5, 10, 15, 3, 6.5, 6, 4, 7.5, 16, 12, 4, 0, 2, 20, 18, 12, 10, 11, 10
This year	15, 12, 4, 5, 12, 6, 0, 2, 3, 10, 7, 8, 3, 12, 22, 18, 20, 14, 11, 8

Table 15.7 Number of hours respondents listened to radio station

- The above are **'raw data'**
  - *Not been ordered, analysed or presented*
  - *The above makes little sense and are of little value*

Averages:

An **average** is a typical representative measure of a set of data. The 'Central tendency' of data.

Several types of average that can be calculated:

- ***The arithmetic mean (the mean)***
- ***The mode***
- ***The median***

Arithmetic mean

The mean of last year's results are _____ and this year's results are _____

The mean number of hours per week of listening to the station _____

Mode:

	Number of hours per week
Last year	0, 1, 2, 3, 4, 4, 5, 6, 6.5, 7.5, **10**, **10**, **10**, 11, 12, 12, 15, 16, 18, 20
This year	0, 2, 3, 3, 4, 5, 6, 7, 8, 8, 10, 11, **12**, **12**, **12**, 14, 15, 18, 20, 22

Table 15.8 Research data in ascending order

- The mode is **of limited value** and it would be wrong to assume that from these results that the average listening time had **increased** by **two hours**.
- Can be useful where **colour** or **size** is the basis of choice: stock holding choice

Median

The median is the **middle item** in a range of ordered data.

Frequency data

Shoe size (x)	Number sold (frequency, f)	Frequency × shoe size
3	4	12
4	13	52
5	18	90
6	20	120
7	17	119
8	12	96
9	11	99
10	5	50
	$f = 100$	$\Sigma f(x) = 638$

Table 15.9 Frequency of shoes sold in a day: by size

Shoe size	Cumulative frequency
3	4
4	17
5	35
6	55
7	72
8	84
9	95
10	100

Table 15.10 Cumulative frequencies of shoe size

- x refers to each individual value
- f means frequency for one individual value
- $\Sigma f(x)$ denotes the sum of all the values.

The three averages can still be calculated from data presented in this form. The mean is

$$\frac{\Sigma f(x)}{f} \quad \frac{\text{Column 3 total}}{\text{Column 2 total}}$$

$$= \frac{638}{100} = 6.38$$

Grouped frequency data

Wage x ($)	Number of workers (f)	Midpoint (x)	$f(x)$	Cumulative frequency
200 to less than 250	25	225	5,625	25
250 to less than 300	40	275	11,000	65
300 to less than 350	58	325	18,850	123
350 to less than 400	12	375	4,500	135
	$\Sigma f = 135$		$\Sigma f(x)$ 39,975	

Table 15.11 Weekly wages grouped data

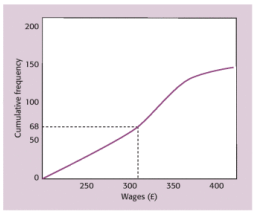

Figure 15.8 A cumulative frequency graph showing wages paid to workers and the median result

Measures of dispersion or spread of data

Two sets of examination results gave similar arithmetic mean results.

- ***Paper 1 had a mean of 52%***
- ***Paper 2 had a mean of 54%***
- One candidate, Joe, gained identical results, 45%, on both papers

He was happy with his performance on paper 1. Why?

- *Paper 1: top mark 83%, lowest mark 14%*
- *Paper 2: top mark 60%, lowest mark 43%*

The range

KEY DEFINITION

range the difference between the highest and lowest value

The inter-quartile range

KEY DEFINITION

inter-quartile range the range of the middle 50% of the data

Measures the range of the 'middle half' of the data and there ignores the lowest 25% and highest 25%

The inter-quartile range is calculated by subtracting the value at the third quartile from the value at the first quartile.

- The value at the third quartile is found by the formula:
  3 × number of results ÷ 4.
- The value at the first quartile is found by the formula:
  number of results ÷ 4.

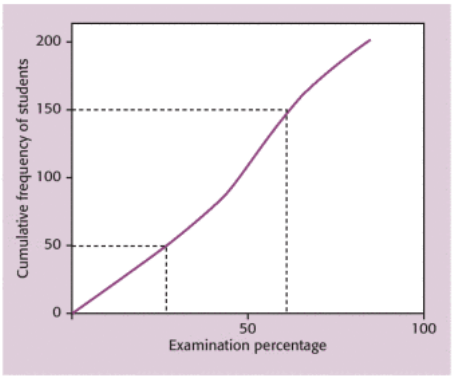

Figure 15.9 Inter-quartile range (200 students)

Activity 15.7