Measurement of marketing phenomenon

Some of these scales are numeric, others are semantic and yet others take a graphical form. The marketing researcher who is familiar with the complete LOL kit of scaling measurements Is better equipped to understand markets. Levels of measurement Most texts on marketing research explain the four levels of measurement: nominal, ordinal, interval and ratio and so the treatment given to them here will be brief. However, it is an important topic since the type of scale used in taking measurements directly impinges on the statistical techniques which can legitimately be used in the analysis.

Nominal scales This, the crudest of measurement scales, classifies Individuals, companies, products, brands or other entities into categories where no order is implied. Indeed it is often referred to as a categorical scale. It is a system of classification and does not place the entity along a continuum. It involves a simply count of the frequency of the cases assigned to the various categories, and if desired numbers can be nominally assigned to label each category as in the example below: Figure 3. 1 An example of a I Which of the following food items do you tend to buy at least once per month? Please tick) I I Milled Rice I I Pastured milk 1 Kara I I Peppers I Palm Oil I I Prawns The numbers have no arithmetic properties and act only as labels. The only measure of average which can be used is the mode because this is simply a set of frequency counts. Hypothesis tests can be carried out on data collected in the nominal form. The most likely would be the Chi-square test. However, it should be noted that the Chi-square is a test to determine whether two or more variables are associated and the strength of that relationship.

It can tell nothing about the form of that relationship, where it exists, I. E. It is not capable of establishing cause and effect. Ordinal scales Ordinal scales involve the ranking of individuals, attitudes or items along the momentum of the characteristic being scaled. For example, if a researcher asked farmers to rank 5 brands of pesticide in order of preference he/she might obtain responses like those in table 3. 2 below. Figure 3. 2 An example of an ordinal scale used to determine farmers' preferences among 5 brands of pesticide. Order of preference Il 13 14 15 I Brand I Aroma I R. I. P. I Kiloton ID. O. A. I Bequeath From such a table the researcher knows the order of preference but nothing about how much more one brand is preferred to another, that is there is no information about the interval between any two brands. All of the information a nominal scale would have given is available from an ordinal scale. In addition, positional statistics such as the median, quartile and percentile can be determined. It is possible to test for order correlation with ranked data.

The two main methods are Superman's Ranked Correlation Coefficient and Sandal's Coefficient of Concordance. Using either procedure one can, for example, ascertain the degree to which two or more survey respondents agree in their ranking of a set of items. Consider again the ranking of pesticides example in figure 3. 2. The researcher might wish to measure similarities ND differences in the rankings of pesticide brands according to whether the respondents' farm enterprises were classified as " arable" or " mixed" (a combination of crops and livestock). The resultant coefficient takes a value in the range O to 1.

A zero would mean that there was no agreement between the two groups, and 1 would indicate total agreement. It is more likely that an answer somewhere between these two extremes would be found. The only other permissible hypothesis testing procedures are the runs test and sign test. The runs test (also known as the Wald- it can take only one of two possible values e. G. African/non-African, yes/no, male/ female – is random or contains systematic ‘ runs’ of one or other value. Sign tests are employed when the objective is to determine whether there is a significant difference between matched pairs of data.

The sign test tells the analyst if the number of positive differences in ranking is approximately equal to the number of negative rankings, in which case the distribution of rankings is random, I. E. Apparent differences are not significant. The test takes into account only the direction of differences and ignores their magnitude and hence it is compatible with ordinal data. Interval scales It is only with an interval scaled data that researchers can Justify the use of the arithmetic mean as the measure of average.

The interval or cardinal scale has equal units of measurement, thus making it possible to interpret not only the order of scale scores but also the distance between them. However, it must be recognized that the zero point on an interval scale is arbitrary and is not a true zero. This of course has implications for the type of data manipulation and analysis we can carry out on data collected in this form. It is possible to add or subtract a constant to all of the scale aloes without affecting the form of the scale but one cannot multiply or divide the values.

It can be said that two respondents with scale positions 1 and 2 are as far apart as two respondents with scale positions 4 and 5, but not that a person with score 10 feels twice as strongly as one with score 5. Temperature is interval scaled, being measured either in Centigrade or Fahrenheit. We cannot speak of OFF being twice as hot as OFF since the corresponding temperatures on the centigrade scale, ICC and -3. ICC, are not in the ratio 2: 1 . Interval scales may be either numeric or semantic. Study the examples below in figure 3. 3.

Figure 3. 3 Examples of interval scales in numeric and semantic formats I Please indicate your views on Balkan Olives by scoring them on a scale of 5 down to 1 (I. E. 5 = Excellent; Poor) on each of the 12 II criteria I Listed I Balkan Olives are: on each line 13 12 II I 15 14 13 packaged I Succulence I I Circle the appropriate score 15 14 13 12 II I Fresh tasting 15 14 I Free of skin blemish I Good value I I Attractively I Please indicate your views on Balkan Olives by ticking the appropriate responses below: Very Good I Excellent I Good

I Fair Poor I Succulent I I Freshness I I Freedom from skin blemish I I Value for money I I Attractiveness of packaging Most of the common statistical methods of analysis require only interval scales in order that they might be used. These are not recounted here because they are so common and can be found in virtually all basic texts on statistics. Ratio scales The highest level of measurement is a ratio scale. This has the properties of an interval scale together with a fixed origin or zero point.

Examples of variables which are ratio scaled include weights, lengths and times. Ratio scales permit the searcher to compare both differences in scores and the relative magnitude of scores. For instance the difference between 5 and 10 minutes is the same as that between 10 and 15 minutes, and 10 minutes is twice as long as 5 minutes. Given that sociological and management research seldom aspires beyond the interval level of measurement, it is not proposed that particular attention be given to this level of analysis.

Suffice it to say that virtually all statistical operations can be performed on ratio scales. Measurement scales The various types of scales used in marketing research fall into two broad categories: imperative and non comparative. In comparative scaling, the respondent is asked to compare one brand or product against another. With noncompetitive scaling respondents need only evaluate a single product or brand. Their evaluation is independent of the other product and/or brands which the marketing researcher is studying.

Noncompetitive scaling is frequently referred to as monadic scaling and this is the more widely used type of scale in commercial marketing research studies. Comparative scales Paired comparisons: It is sometimes the case that marketing researchers wish to find UT which are the most important factors in determining the demand for a product. Conversely they may wish to know which are the most important factors acting to prevent the widespread adoption of a product. Take, for example, the very poor farmer response to the first design of an animal-drawn mould board plough.

A combination of exploratory research and shrewd observation suggested that the following factors played a role in the shaping of the attitudes of those farmers who feel negatively towards the design: ; Does not ridge ; Does not work for inter-cropping ; Far too expensive ; New technology too risky Too difficult to carry. Suppose the organization responsible wants to know which factors is foremost in the farmer’s mind. It may well be the case that if those factors that are most important to the farmer than the others, being of a relatively minor nature, will cease to prevent widespread adoption.

The alternatives are to abandon the product’s re-development or to completely re-design it which is not only expensive and time-consuming, but may well be subject to a new set of objections. The process of rank ordering the objections from most to least important is best approached through the questioning quinine known as ‘ paired comparison’. Each of the objections is paired by the In ‘ paired comparisons’ every factor has to be paired with every other factor in turn. However, only one pair is ever put to the farmer at any one time.

The question might be put as follows: Which of the following was the more important in making you decide not to buy the plough? I ; The plough was too expensive I ; It proved too difficult to transport In most cases the question, and the alternatives, would be put to the farmer verbally. He/she then indicates which of the two was the more important and the researcher kicks the box on his questionnaire. The question is repeated with a second set of factors and the appropriate box ticked again. This process continues until all possible combinations are exhausted, in this case 10 pairs.

It is good practice to mix the pairs of factors so that there is no systematic bias. The researcher should try to ensure that any particular factor is sometimes the first of the pair to be mentioned and sometimes the second. The researcher would never, for example, take the first factor (on this occasion ‘ Does not ridge’) and systematically compare it to each of the others n succession. That is likely to cause systematic bias. Below labels have been given to the factors so that the worked example will be easier to understand.

The letters A – E have been allocated as follows: I IA = Diodes not ridge 1 B = Afar too expensive I Nine technology too risky I Diodes not work for inter-cropping I I Too difficult to carry. The data is then arranged into a matrix. Assume that 200 farmers have been interviewed and their responses are arranged in the grid below. Further assume that the matrix is so arranged that we read from top to side. This means, for example, that 64 out of 200 farmers said the fact that the plough was too expensive was a greater deterrent than the fact that it was not capable of ridging.

Similarly, 174 farmers said that the plough’s inability to inter-crop was more important than the inability to ridge when deciding not to buy the plough. Figure 3. 4 A preference matrix IA 1100 B 136 ICC 180 ID 126 II 120 1164 1120 1174 1180 1 1100 1160 1176 1166 1 140 1100 1168 1124 1 124 132 1100 1102 1 134 176 198 1100 1 If the grid is carefully read, it can be seen that the rank order of the factors is – I Most important crop II I Too difficult to carry

ICC I New technology/high risk ID I Does not inter It can be seen that it is more important for designers to concentrate on improving transportability and, if possible, to give it an inter-cropping capability rather than focusing on its ridging capabilities (remember that the example is entirely hypothetical). One major advantage to this type of questioning is that whilst it is possible to obtain a measure of the order of importance of five or more factors from the respondent, he is never asked to think about more than two factors at any one time.

This is especially useful when dealing with illiterate farmers. Having said that, the researcher has to be careful not to present too many pairs of factors to the farmer during the interview. If he does, he will find that the farmer will quickly get tired and/or bored. It is as well to remember the formula of n(n – 1)/2. For ten factors, brands or product attributes this would give 45 pairs. Clearly the farmer should not be asked to subject himself to having the same question put to him 45 times.

For practical purposes, six factors is possibly the limit, giving 15 pairs. It should be clear from the procedures described in these notes that the paired comparison scale gives ordinal data. Dollar Metric Comparisons: This type of scale is an extension of the paired comparison method in that it requires respondents to indicate both their preference and how much they are willing to pay for their preference. This scaling technique gives the marketing researcher an interval – scaled measurement. An example is given in figure 3. 5. Figure 3. An example of a dollar metric scale I Which of the following types of fish do you prefer? I How much more, in cents, would you be prepared to pay for your preferred fish? I Fresh (gutted) I I Frozen 0. 60 10.

70 10. 20 I Fresh (gutted) I Smoked I I Frozen(gutted) I Smoked | $0. 70 I Fresh I Frozen 10. 50 I I From the data above the preferences shown below can be computed as follows: 1+0. 70 fish: I I Fresh fish(gutted): 1+0. 20 1+ (-0. 20) 1(-0. 70) 1+0. 30 1= 1. 60 I Fresh fish: 10. 60 I I Frozen fish: 1(-0. 60) 1+ (-0. 50) 1+0. 50 1+ (-0. 70) 1+ (-0. 0) The Unity-sum-gain technique: A common problem with launching new products is one of reaching a decision as to what options, and how many options one offers. Whilst a company may be anxious to meet the needs of as many market segments as possible, it has to ensure that the segment is large enough to enable him to make a refit. It is always easier to add products to the product line but much more difficult which are likely to prove successful is the unity-sum-gain approach. The procedure is to begin with a list of features which might possibly be offered as ‘ options’ on the product, and alongside each you list its retail cost.

A third column is constructed and this forms an index of the relative prices of each of the items. The table below will help clarify the procedure. For the purposes of this example the basic reaper is priced at $20, 000 and some possible ‘ extras’ are listed along with their prices. The total value of these hypothetical ‘ extras’ is $7, 460 but the researcher tells the farmer he has an equally hypothetical $3, 950 or similar sum. The important thing is that he should have considerably less hypothetical money to spend than the total value of the alternative product features.

In this way the farmer is encouraged to reveal his preferences by allowing researchers to observe how he trades one additional benefit off against another. For example, would he prefer a side rake attachment on a 3 meter

head rather than have a transporter trolley on either a standard or 2. Mm wide head? The farmer has to be told that any unspent money cannot be retained by him so he should seek the best value-for-money he can get. In cases where the researcher believes that mentioning specific prices might introduce some form of bias into the results, then the index can be used instead.

This is constructed by taking the price of each item over the total of $ 7, 460 and multiplying by 100. Survey respondents might then be given a maximum of 60 points and then, as before, are asked how they would spend these 60 points. In this crude example the index numbers are not too easy to work with for most respondents, so one would round hem as has been done in the adjusted column. It is the relative and not the absolute value of the items which is important so the precision of the rounding need not overly concern us.

The design of the final market version of the product can then reflect the farmers' needs and preferences. Practitioners treat data gathered by this method as ordinal. Noncompetitive scales Continuous rating scales: The respondents are asked to give a rating by placing a mark at the appropriate position on a continuous line. The scale can be written on card and shown to the respondent during the interview. Two versions of a continuous rating scale are depicted in figure 3. 7. Figure 3.

Continuous rating scales [pick] line into as many categories as desired and assigning the respondent a score based on the category into which his/her mark falls, or by measuring the distance, in millimeters or inches, from either

end of the scale. Whichever of these forms of the continuous scale is used, the results are normally analyses as interval scaled. Line marking scale: The line marked scale is typically used to measure perceived similarity differences between products, brands or other objects.

Technically, such a scale is a form of what is termed a semantic differential scale since each end of the scale is babbled with a word/phrase (or semantic) that is opposite in meaning to the other. Figure 3. 8 provides an illustrative example of such a scale. Consider the products below which can be used when frying food. In the case of each pair, indicate how similar or different they are in the flavor which they impart to the food. Figure 3. 8 An example of a line marking scale For some types of respondent, the line scale is an easier format because they do not find discrete numbers (e. . 5, 4, 3, 2, 1) best reflect their attitudes/feelings. The line marking scale is a continuous scale. Itemized rating scales: With an itemized scale, respondents are provided with a scale having numbers and/or brief descriptions associated with each category and are asked to select one of the limited number of categories, ordered in terms of scale position, that best describes the product, brand, company or product attribute being studied. Examples of the itemized rating scale are illustrated in figure 3. 9. Figure 3. Itemized rating scales Itemized rating scales can take a variety of innovative forms as demonstrated by the two illustrated in figure 3. 9, which are graphic. Figure 3. 10 Graphic itemized scales Whichever form of itemized scale is applied, researchers usually treat the data as interval level. Semantic scales: This type of scale makes extensive use of words rather than numbers. Respondents describe their feelings about the products or brands on scales

with semantic labels. When bipolar adjectives are used at the end points of the scales, these are termed semantic differential scales.