Research paper on scales of measurement

Business, Company

Introduction:

Marketing Research is conducted on the basis of the feedback collected from a good many respondents including customers, competitors, general public and intermediaries. The questions asked to the respondents during a marketing survey should be analyzed precisely because the success of the survey depends on the accuracy of data interpretation and analysis. Several scales of measurement are used to analyze the questions. The measurement scales are broadly categorized into four segments: 1) Nominal Scale, 2) Ordinal Scale, 3) Interval Scale and 4) Ratio Scale. This paper would discuss upon these four scales of measurement describing their usage in questionnaires.

Nominal Scale

The nominal scale also known as dummy coding is the lowest form of measurement used mainly for collecting and categorizing data. This scale distinguishes between people, objects and subjects on the basis of their names, categories and other relevant qualitative features. Numbers, labels and symbols are used in nominal scale to determine whether or not a particular object belongs to a category. The nominal scale is the foundation for analysis like ANOVA or Analysis of Variance because such analyses require having one category compared to another. Nominal scale, however, is unable to extract much information about the concerned subject other than the category it belongs to. For example, on a survey questionnaire conducted on smoking, the nominal scale only would be able to gather data related whether someone is smoker or not. It would not glean other relevant

information such as how many times a day the smoker smokes, how many cigarettes he smokes a day and when he did have his first puff etc. In nominal scale the numbers used don't have any numeric value. The numbers used are purely arbitrary. For instance, if a company wishes to conduct a marketing research as to whether or not a particular product is more effective in luring males and females, it could categorize the questions in yes/no pattern, assigning '1' to females and '2' to males. Here the numbers '1' and '2' are completely arbitrary without any numeric value. They are just identifiers which could be easily replaced by 'A' or 'B' or whatever suits one's fancy (Price & Oswald, 2006). The point is that the data is collected with the numbers used like a label without indicating any order or meaning.

Ordinal Scale

Ordinal scale is used in ranking objects, people and items in order of their degrees of difference. This scale is mainly used for satisfaction, marketing and attitudinal research. Ordinal scale too like nominal scale places the focal objects into some categories but unlike nominal scale which does not give any information other than the categorization, ordinal scale ranks the objects from highest to lowest and vice versa. This way instead of simply putting objects into a category, ordinal scale furnishes some idea about the relations of one object to another. However, ordinal scale too has some lack of information in its data. It merely specifies the degrees of difference existing between the objects ranked in order without indicating the amount of the difference. For example, in marketing research questionnaire, the questions are sometimes arranged placing the objects in order of their degrees of difference. If a beer company wishes to gather information relative to which

of its beer is most flavorful, it may arrange questions ranking 5 types of beer from least flavorful to most flavorful or vice versa. This way the beer company would gather ordinal information of preference. But the ordinal scale used here won't be able to fetch information related to the distance in difference meaning that for one respondent the highest flavorful beer might be far superior to the second preferred beer but for another the distance between the first and second beer might be subjectively small. Thus ordinal scale only informs about the order of difference and not about the positional distances (Monash University).

Interval Scale

Unlike the ordinal scale which doesn't capture information related to the positional distance of difference between objects, the interval scale measures the distance of difference existing between one object from another. It is a standard scale commonly used in marketing research analysis. This scale is used to calculate statistical measures like Standard Deviation (SD), Arithmetic Mean (AM) and Pearson Correlation Coefficient (PCC) (Avasarikar & Chordiya, 2007). The key element of the interval scale is based on the assumption that the points of data are equidistant. For instance, the Celsius temperature is a good example of an interval scale because the point of difference between each value is the same. The difference between 80 and 70 degrees is only of 10 degrees, similar to the amount of difference between 50 and 60 degrees. Often in marketing research analysis, the customer satisfaction survey questionnaire is set in the style of interval scale asking customers to rate their satisfaction level on a 7 point scale like the following:

- Extremely dissatisfied
- Very dissatisfied
- Somewhat dissatisfied
- Neutral
- Somewhat satisfied
- Very satisfied
- Extremely satisfied.

So unlike the ordinal scale which only ranks items in order of their difference without pinpointing the distance of difference, the interval scale points out the distance of difference between each item. However, the interval scale does have one problem. It doesn't have the concept of zero without which computation of ratios is impossible and this brings in place the Ratio scale.

Ratio Scale

The Ratio scale is the most precise and richest of all scales fulfilling all the four properties of measurement: identity, magnitude, equal intervals and a minimum value of zero (Stat Trek). Ratio scale has all the components of nominal, ordinal and interval scale with an additional attribute of zero point. With the help of ratio scales, all the statistical and arithmetic operations and tests including average, standard deviation, geometric arithmetic mean, pearson correlation, t-test and F-test can be accomplished ((Avasarikar & Chordiya, 2007). The examples of the usage of Ratio scale are a speedometer, the cost of a beer bottle, any length or weight measurement and so on. Ratio scales are minimally used in marketing research unless the base items are available for drawing comparisons. Ratio scales are typically used to fetch quantitative information related to age, income, years of

service and so on. Market share, sales figures, quantities purchases all are computed using a ratio scale. Certain demographic survey containing questions related to the incomes of respondents have ratio scale properties. Following is an example of such ratio scale questionnaire:

- $0-$20, 000
- $20, 000-$39, 999
- $40, 000-$69, 999
- $70, 000-$99, 999
- more than $100, 000

Conclusion

The success of a survey depends a lot on the accuracy of data analysis. The scales of measurement used to analyze data are divided into four categories - nominal, ordinal, interval and ratio scale. Nominal scale is used for categorization of objects. Ordinal scale is used for ranking the objects. Interval scale which includes both the characteristics of nominal and ordinal scale is used for measuring the distance of difference existing between two data points and finally the ratio scale which incorporates all the attributes of the previous three scales with an additional component of zero point. All of these scales are used in conducting a successful marketing survey, though ratio scale is the least used.

References

Price, Dr. & Oswald, Dr (2006). Scales of Measurement. California State University. Retrieved on 19th August 2013 from

Measurement Scales. Monash University. Retrieved on 19th August 2013

from

Avasarikar, D. P. & Chordiya, Suresh B.(2007). Marketing Research. Nirali Prakashan. Retrieved on 19th August 2013 from

Scales of Measurement in Statistics. Stat Trek. Retrieved on 19th August 2013 from