

Scales and Measurement

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Agenda

- Scales and Measurement
- [Development of Measurement Scales](#)
- [Types of Measurement Scales](#)
- [Criteria for Good Measurement](#)
- Sources of Measurement Problems

MEASUREMENT

- The process of assigning numbers or labels to different objects under study to represent them quantitatively or qualitatively



A concept is a general idea derived or inferred from specific instances or occurrences


A *construct* is a general idea or an abstract inferred or derived from specific instances

Constructs can also be considered as certain types of concepts which simplify com

A constitutive definition of the concept will specify the research boundaries and also will define the central theme of the study.

The primary purpose defining the concept constitutively of framing and addressing the research question in an appropriate manner

E.I: Primary education covering state government-aided schools



The operational definition defines precisely what attributes and features of the concept are to be measured.

Although operational definitions can be developed for defining the characteristics that need to be measured, it is sometimes impossible to measure certain features that may nevertheless be crucial for the study.

An operational definition acts as an interface between the theoretical concepts and the live environment.

In business research:

- what is to be measured
- how it will be measured
- the concept that needs to be measured

Research on Measuring Materialism

- possessiveness
- non-generosity
- Envy

338 members comprising people from different spheres where was selected.

- The sample was tested for reliability, validity and their relationships to measures of happiness.
- The study found that possessiveness and non-generosity were very similar between male and female members in the sample, but it was found that men were more envious than women.

Development of Measurement Scales

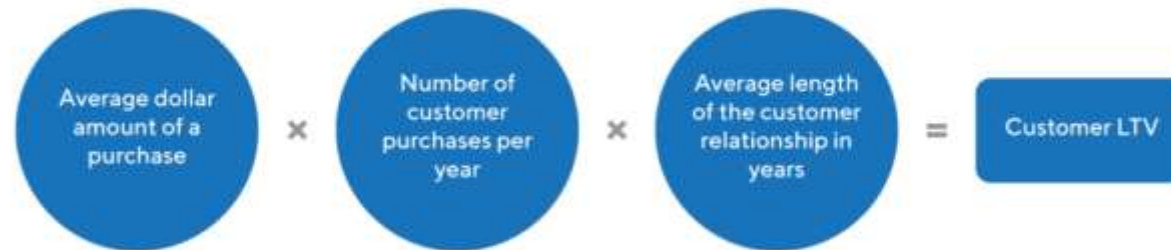
Customer retention rate formula: $[(E-N)/S] \times 100 = CRR$

1. To determine your retention rate, first identify the time frame you want to study
2. Next, collect the number of existing customers at the start of the time period (S)
3. Then find the number of total customers at the end of the time period (E)
4. Finally, determine the number of new customers added within the time period (N)

Customer lifetime value (LTV)

Here the net present value of the customer is analyzed by the seller

Customer Lifetime Value



Types of Measurement Scales

THE FOUR LEVELS OF MEASUREMENT:

	Nominal	Ordinal	Interval	Ratio
Categorizes and labels variables	✓	✓	✓	✓
Ranks categories in order		✓	✓	✓
Has known, equal intervals			✓	✓
Has a true or meaningful zero				✓

NOMINAL DATA

Nominal data divides variables into mutually exclusive, labeled categories.

Examples

Eye color



Smartphone



Transport



How is nominal data analyzed?

Descriptive statistics:
Frequency distribution and mode.

Non-parametric statistical tests

ORDINAL DATA

Ordinal data classifies variables into categories which have a natural order or rank.

Examples

School grades



Education level



Seniority level



How is ordinal data analyzed?

Descriptive statistics:
Frequency distribution, mode, median, and range

Non-parametric statistical tests

INTERVAL DATA

Interval data is measured along a numerical scale that has equal intervals between adjacent values.

Examples

Temperature



IQ score



Income ranges



How is interval data analyzed?

Descriptive statistics: Frequency distribution; mode, median, and mean; range, standard deviation, and variance

Parametric statistical tests (e.g. t-test, linear regression)

RATIO DATA

Ratio data is measured along a numerical scale that has equal distances between adjacent values, and a true zero.

Examples

Weight in KG



Number of staff



Income in USD



How is ratio data analyzed?

Descriptive statistics: Frequency distribution; mode, median, and mean; range, standard deviation, variance, and coefficient of variation

Parametric statistical tests (e.g. ANOVA, linear regression)

- **Good Measurement**

- reliability,
- validity,
- sensitivity,
- generalizability
- relevance