BUSINESS PHENOMENA MEASUREMENT AND DATA COLLECTION

JÓZEF DZIECHCIARZ
WROCLAW UNIVERSITY OF ECONOMICS

BUSINESS DATA

➢ DATA
➢ INFORMATION
➢ KNOWLEDGE
➢ WISDOM

BUSINESS DATA

➢BUSINESS DATA CLASSIFICATION
  ➢FACTS most important information type
    ➢Types factual data:
      ➢demographic
      ➢sociological
      ➢behavioral
    ➢Some data with the nature of facts, are the quasi – facts
      A typical example is the GDP

BUSINESS DATA

➢KNOWLEDGE is the second, after facts, the most important type of data

➢OPINIONS - this type of information contains knowledge about how people perceive external stimuli, what they believe and what is important to them at the reception of reality

  ➢The most important opinion type are ATTITUDES. It is a set of rational or emotional predisposition to do (or not to do) something or behave in a certain way

  ➢Another form of opinion are IDEAS, they relate to the opinions about what is the specific object or situation

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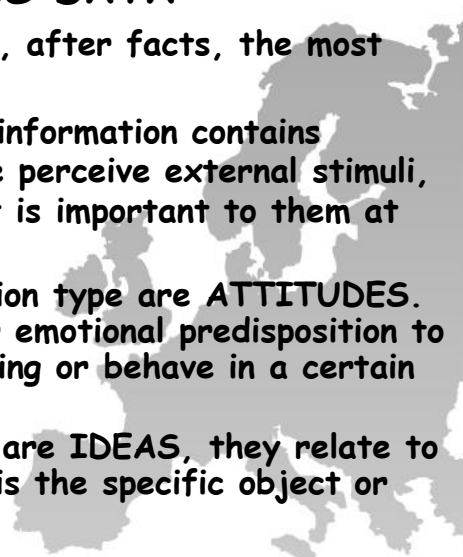
BUSINESS DATA

➢ The INTENTIONS of consumer behaviour, information on actions which they wish to realize, in other words, these are the expectations for their behaviour

➢ MOTIVES behaviour caused with internal forces that people (consumers, policy makers) make such and no other choices

➢ BUSINESS DATA (business variable) is attributed to the following functions:
  ➢ Causal, cause - effect, selected variables are treated as the effect of the actions of other variables (causes)
  ➢ Descriptive
  ➢ Identification

BUSINESS DATA

➢ Statistical data are described as *quantitative* or *qualitative*

➢ Quantitative information is easier to obtain. Standard references (e.g. Statistical Offices) are the first place where to begin searching

➢ It is harder to locate the source of qualitative data. Usually their acquisition requires extensive query in the economic literature, political, statistical, marketing and even technical or sociological sources

➢ Quantitative data in most cases are periodic data contained in most statistical sources that collect and publish regular economic or demographic information

➢ Qualitative data, in most cases has "ad hoc data„ character, collected sporadically are not so easy to locate and obtain

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BUSINESS DATA CLASSIFICATION

➢ The data obtained in the process of business phenomena measurement may be divided into
  ➢ Secondary data, and
  ➢ Primary data
➢ Primary data - data collected for the purposes of current analysis
➢ It is collected by field studies conducted alone or research commissioned to specialised market research firm
➢ Primary data collection process is attributed to the Field Research

BUSINESS DATA CLASSIFICATION

➢ SECONDARY INFORMATION (data) exist independently of the current investigation
➢ The data collection process is referred to as DESK RESEARCH or office studies
➢ Companies usually use its own employees to collect secondary data
➢ Some analyses may be conducted by external experts

SECONDARY DATA COLLECTION - PROBLEMS

➢ The priority is to use cheap and quickly available secondary data, particularly from internal sources
➢ Usually there is an excess of data – which is why it is necessary to prepare inventory of the information needs
➢ PROCEDURE
  ➢ The draft report – design of the tool (form) to collect the necessary data
  ➢ Identification of internal secondary data sources
  ➢ Identification of external secondary data sources (including the availability and prices)
  ➢ The plan of obtaining primary data

CLASSIFICATION OF SECONDARY DATA SOURCES

☞ **Secondary data from sources**
  ☞ Internal
  ☞ External
☞ **Internal sources of data include**
  ☞ Financial data - Accounting
  ☞ Human resources, compensation system
  ☞ Production
  ☞ Marketing and Logistics, etc.

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CLASSIFICATION OF SECONDARY DATA SOURCES

☞ **Additionally,** internal sources of data include
- ☞ Strategic and operational documents
- ☞ Record of events important from the current analysis point of view
- ☞ Company's library, including the results of previous studies, collections of newspapers, magazines, legislation acts, etc.
- ☞ Computer databases
  - ☞ MIS System Components, e.g. MMIS
  - ☞ Elements of DSS type systems
  - ☞ Elements CRM systems, including loyalty programs
- ☞ Mailing address bases (traditional and electronic)

CLASSIFICATION OF SECONDARY DATA SOURCES

☞ **Additionally,** internal sources of data include
- ☞ Transactional databases (computer or traditional)
  - ☞ Supply management system
  - ☞ Sales and Invoicing system
  - ☞ Warehouse (Logistics)
  - ☞ Wages and staff
  - ☞ PPS (pre-production system)

CLASSIFICATION OF SECONDARY DATA SOURCES

☞ Databases are always one of the basic elements of information systems both MIS and DSS
☞ The importance of business databases can be summarized by saying that they allow:
  ☞ Identify the most and least favourable clients or their groups
  ☞ Determination of the most profitable areas of business activity - and thus increase the efficiency of the company
  ☞ Targeting business activity for these products, services and segments that need it most
  ☞ Increasing revenues through individualization of products, prices and promotions to specific market segments (types of customers)
  ☞ The evaluation of the possibility of introducing new products or services
  ☞ Identification of the products and services that are "best sellers" (most profitable business areas)

CLASSIFICATION OF SECONDARY DATA SOURCES

☞ EXTERNAL DATA SOURCES INCLUDE
  ☞ Internet
  ☞ Library - guides, indexes of the content, reference and statistical data lists
  ☞ Publications of business organizations, governmental, commercial, consumer
  ☞ Commercial product offer of companies and institutions collecting economic data and market research
  ☞ Free and commercial databases. Typically, computer databases, including the available on-line
  ☞ Business intelligence agencies
  ☞ The lists of judicial records, registers unreliable business partners, etc.

SECONDARY DATA COLLECTION - PROBLEMS

☞ **Assessment of the adequacy and reliability of external secondary data include**
- ☞ Rating the credibility of sources – companies and institutions collecting and offering data
- ☞ Assessment of the purpose for which the data was collected
- ☞ Evaluation of data collection process
- ☞ The time, place and the territorial scope of the data collection process
- ☞ Data collection method
- ☞ Used definitions, classifications, sections, etc.
- ☞ Used measurement units

SOURCES OF PRIMARY DATA

➢ **Primary data collection methods**
- ➢ Surveys
- ➢ Observation
- ➢ Experimentation

Questionaire survey, conversation, direct (personal) or through communication medium

Observation, passive registration of phenomena

The experiment, researcher actively interfere in business reality and registers the effects of this intervention

Data collection methods in quantitative research SAMPLING METHOD

➢ **Random sampling methods – REPRESENTATIVE SAMPLING METHOD**

➢ **Non-random methods of respondents selection**

NON-RANDOM SELECTION OF RESPONDENTS

➢ **Quota method**

  ➢ **The most frequently used method of non-random selection of respondents in market research**

  ➢ **It is based on knowledge of the structure adopted by the general population characteristics (ie. Control variables) and the imposition of this structure on the analysed sub population**

  ➢ **Applied features - criteria are: age, gender, family size, income, type of social group or activity**

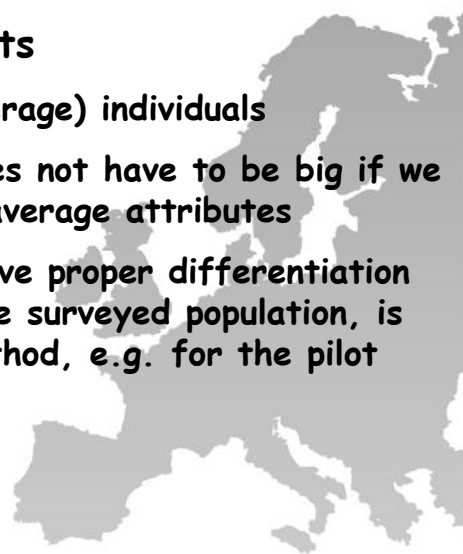## NON-RANDOM SELECTION OF RESPONDENTS

➢ **Quota method**

  ➢ **The number of groups (segments) in the sample is determined by multiplying the percentage distribution of selected features in the general population by the total sample size**

  ➢ **Most merely for 2 or 3 features which give the opportunity to quantitatively small number of segments**

  ➢ **With more features as control variables and more segments - harder to complete an appropriate part of the community Trial**

NON-RANDOM SELECTION OF RESPONDENTS

➢ **Selection of typical units**

 ➢ **Selection of typical (average) individuals**

 ➢ **The number of units does not have to be big if we want to determine the average attributes**

 ➢ **This method does not give proper differentiation of characteristics of the surveyed population, is used as an auxiliary method, e.g. for the pilot studies**

NON-RANDOM SELECTION OF RESPONDENTS

➢ **Selection by eliminating of non-standard (untypical) units**

 ➢ **Selection by eliminating of non-standard units of the group, does not give adequate diversity of the population and is merely a supporting method**

NON-RANDOM SELECTION OF RESPONDENTS

➤ **Purposeful selection**

➤ **Purposeful selection (by convenience). The most typical case of non-random selection**

➤ **It is based on purely subjective choice of units under test to try in hopes of getting the widest and fullest information**

➤ **The method used in the interviews psychological particular depth, as well as experimental studies**

➤ **Selected are those objects which meet the objectives of the research, or the units that are most easily accessible**

NON-RANDOM SELECTION OF RESPONDENTS

➤ **Purposeful selection**

➤ **Purposeful selection, is based on a subjective selection of units for testing, it depends on the scope of information which the researcher has from the respondent**

➤ **Opinions of those deliberately targeted persons may, however, differ radically**

➤ **Purposeful selection is subjective - the result can not serve as a proxy result for the whole population. Only for explicitly analysed group**

NON-RANDOM SELECTION OF RESPONDENTS

➢ **The selection of accidentally chosen units e.g. capture on the street**

  ➢ **It is based on a random the choice of certain individuals who in the (chance) circumstance found themselves in a comfortable reach of interviewer**

  ➢ **The choice of the individual decide on the scope of a study**

  ➢ **Used e.g. By telephone surveys. These studies may provide information, but they are unrepresentative**

NON-RANDOM SELECTION OF RESPONDENTS

➢ **SELECTION BY CONVENIENCE. Tested units are friends, relatives, objects in our environment**

➢ **THE NETWORK CHOICE: the subjects are the customers of specific service network**

➢ **SNOWBALL METHOD**

  ➢ **Initial respondents selected randomly then respondents provided by the initial respondents**

  ➢ **Selection relies on reaching the small number of respondents, and then through them to the next known to them individuals with similar characteristics**

  ➢ **In this way, the increase in the number of units in the sample until the assumed number of respondents is reached**

DETERMINING THE NUMBER OF UNITS IN TEST POPULATION

➢ **Arbitrarily or on the basis of own judgment**

➢ **The size of the surveyed population is determined by the minimum number of required observations in an array of contingency - based on the requirements of the planned analysis techniques**

➢ **The budget determines the size of the surveyed population**

➢ **The sample size is determined based on confidence intervals and based on hypothesis testing REPRESENTATIVE METHODS**

DATA COLLECTION METHODS IN QUANTITATIVE RESEARCH
QUESTIONNAIRE – respondent alone fills out the form

➢ **Traditonal mail**

➢ **Auditorium survey**

➢ **Internet survey (CAWI - Computer-Assisted Web Interviewing)**

  ➢ **Drawback: because of the lack of control (knowledge) on access to the Internet (for respondents) survey may not be representative**

  ➢ **Advantage: very fast in implementation (several hundred surveys per day), low cost, suitable for specific groups of consumers (e.g. customer online banks)**

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DATA COLLECTION METHODS IN QUANTITATIVE RESEARCH
QUESTIONNAIRE – interviewer participates in filling in the form

➢ **CATI (Computer-Assisted Telephone Interview)** **Computer Assisted, individual telephone interview**

➢ **PAPI (Paper & Pen Personal Interview) direct, individual, structured interview**

➢ **CAPI (Computer-Assisted Personal Interview) direct, individual, computer-aided interview**

➢ **CAWI – Internet survey (Computer-Assisted Web Interviewing)**

QUESTIONNAIRE

➢ **Basic errors in the construction survey**
  - ➢ **Too many questions**
  - ➢ **Questions incoherent, ambiguous in interpretation**
  - ➢ **Too many questions**
  - ➢ **Incorrect order**
  - ➢ **Unsuitable measurement scales**
  - ➢ **Improperly selected preliminary question**
  - ➢ **No time reference with questions about the facts**
  - ➢ **Lack of transparency survey**
  - ➢ **Respondent description questions at the beginning of the questionnaire**

QUESTIONNAIRE

➢ **The use of open-ended questions**
  - ➢ **In explorative research**
  - ➢ **There is no known list of variants of answers which interviewer can give to respondents**
  - ➢ **The list of options is too long (e.g. In which store is the nicest service)**
  - ➢ **It is planned to quote the respondents in final report**
  - ➢ **It gives respondents the opportunity to signaling problems assessed by them as important and absent in the poll or in the cafeteria variants of answers**

QUESTIONNAIRE

➢ **The use of open-ended questions**
  - ➢ **Respondents suggest improvements or solutions (e.g. What you would change in this depilator)**
  - ➢ **Probing (e.g. Can you add something to this opinion)**
  - ➢ **In intimate or sensitive cases (e.g. What kind of contraception do you use)**
  - ➢ **Allow comments for people who have strong opinions on every (selected) topic**

QUESTIONNAIRE

➢ **Disadvantages of open-ended questions**
  - ➢ **Replies incomplete or not on topic**
  - ➢ **Respondents forget the obvious variants of answers**
  - ➢ **It is difficult to write down the replies**
  - ➢ **Expensive treatment**
  - ➢ **Errors in coding**
  - ➢ **Overrepresentation of answers: I do not know, it's hard to say**
  - ➢ **Differentiation of responses makes grouping very hard (impossible)**

QUESTIONNAIRE

➢ **The use of closed questions**
  - ➢ **In confirmative studies**
  - ➢ **It is known list of variants of answers which respondent can give**
  - ➢ **The aim of the study is to classify responses into categories (e.g. The percentage of users of wash powder Visir)**
 - ➢ **It is planned to repeat the study - it provides comparability of results**

QUESTIONNAIRE

➢ **The use of closed questions**
- ➢ **It is planned statistical and econometric analysis of the results**
- ➢ **Haste in conducting and analysing the test results**
- ➢ **With the non-metric scales**

QUESTIONNAIRE

➢ **The advantages of closed questions**
- ➢ **Easier process of selecting the response by the respondent**
- ➢ **Easier comparability of results by repeated research**
- ➢ **The comparability of the results of responses of different respondents**
- ➢ **Questionnaire (Poll) is less monotonous**
- ➢ **They enable very precise questions to be asked**
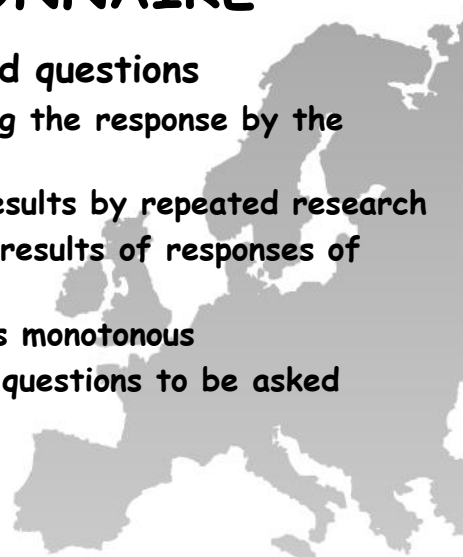
QUESTIONNAIRE

➢ **The disadvantages of closed questions**
   ➢ **The preparation is time consuming (preparation and testing of the replies cafeteria)**
   ➢ **Risk of error of omission for each type of response**
   ➢ **The effect of the first-last answer**
   ➢ **Difficulties in surveying respondents with unusually strong views**

THE MEASUREMENT SCALES

➢ **Measurement involves assigning selected symbols to observed (measured) fact or units**
➢ **THE MEASUREMENT SCALES TYPES include**
   ➢ **WEAK SCALES (nonmetric, qualitative)**
      ➢ **CATEGORICAL**
      ➢ **ORDINAL**
   ➢ **METRIC (strong, quantitative) SCALES**
      ➢ **INTERVAL**
      ➢ **RATIO (quotient; comparative; relative)**
      ➢ **RATIO - INTERVAL; Full metric (with absolute zero)**

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CHANGING THE LEVEL OF MEASUREMENT SCALE

➢ **Only the results of measurement on a stronger scale can be transformed into numbers belonging to the weaker scale**

➢ **Quantitative methods that can be used for the measurement results on a scale weak, can also be used to numbers obtained from the measurement at a stronger**

MEASUREMENT SCALE TYPE	SCALE CHARACTERISTIC
CATEGORICAL	IDENTIFICATION
ORDINAL	POSITION IN THE ORDER (RANK)
INTERVAL	OBJECTS COMPARISON
RATIO (comparative; quotient)	VALUES COMPARISON

SCALE TYPE	POSSIBLE CHARACTERISTICS
CATEGORICAL (NOMINAL)	— Number of cases — Modal — Correlations
ORDINAL	— Median — Quantiles — Rank correlations
INTERVAL	— Arithmetic mean — Average absolute deviation — Variance and standard deviation
RATIO	— Geometric mean — Harmonic mean — Variability coefficient

SCALE TYPE	CHARACTERISTICS
CATEGORICAL (NOMINAL)	The assignment of each object into disjoint category disordered (in the sense of hierarchy) collection of units
Hierarchical	Assignments each object to a certain branch of graph (the trees). It enables grouping category into Super categories
ORDINAL	Hierarchical (full or partial) arrangement of objects. It introduces a hierarchy of categories.
Distance scale	Hierarchical (full or partial) arrangement of the distance between (p - 1) adjacent (neighbouring) objects. It introduces a hierarchy of distances between adjacent objects
Distance scale with higher rank metrics	Hierarchical (full or partial) arrangement the distance between $0,5*[p*(p-1)]$ pairs of objects. Introduces hierarchy distance between all pairs of objects

SCALE TYPE	CHARACTERISTICS
INTERVAL	It specifies the distance between the numerical differences of values for (p - 1) adjacent objects
RATIO	Specifies a numeric values of ratios calculated for values of features of (p - 1) adjacent objects
FULL METRIC SCALE	It introduces the zero point. Specifies a numeric values within all objects (distance from a unique point (absolute zero).

➢ **The only allowed operation performed on the ordinal and nominal scales is counting**
➢ **The interval scale allows:**
  ➢ **Addition and subtraction**
  ➢ **The interval scale has no „natural" origin. The zero value on this scale is usually assumed, either arbitrarily or by the convention**
➢ **The ratio scale allows:**
  ➢ **Addition, subtraction, multiplication and division**
  ➢ **„The natural" origin of the ratio scale is zero (this scale is bounded from left)**

STATISTICAL METHODS IN BUSINESS RESEARCH

➢ **Statistical data analysis can be classified into:**

➢ Univariate methods (e.g. arithmetic mean, coefficient of variation, standard deviation, median, mode, t - test)

➢ Bivariate methods (e.g. Pearson linear coefficient of correlation, simple regression, chi - square test)

➢ Multivariable methods (e.g. multiple regression, clustering methods, linear ordering methods, factor analysis, discriminant analysis, multidimensional scaling)
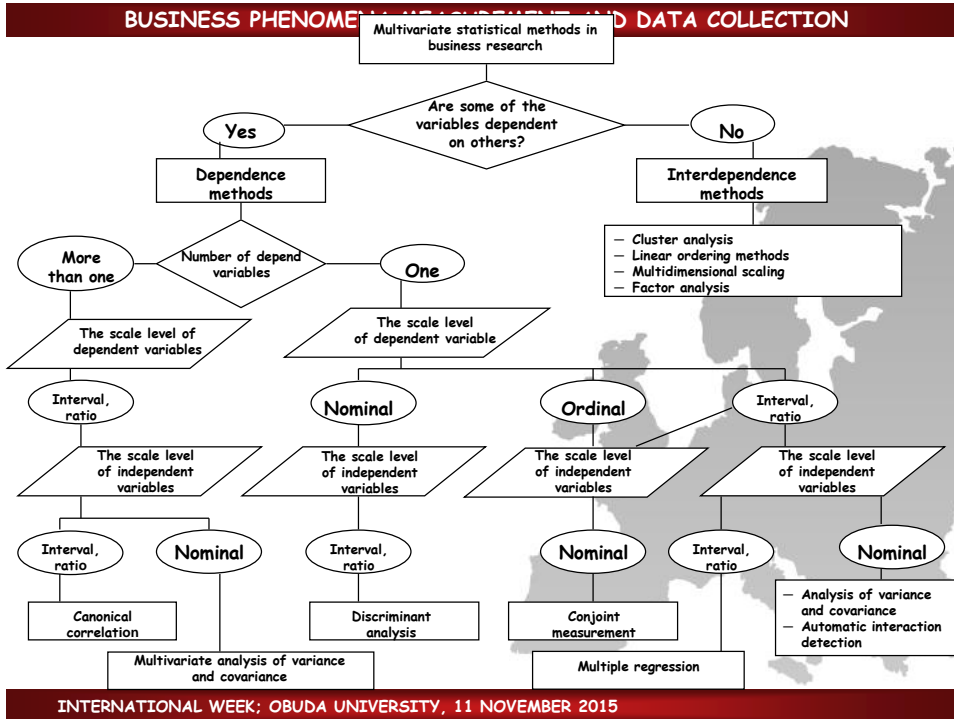
Univariate and bivariate methods of data analysis

Scale level of variables

	Nominal	Ordinal	Interval	Ratio
Measures of central tendency	mode	median	arithmetic mean	geometric mean, harmonic mean
Measures of dispersion	measures of information	interquartile range	variance, standard deviation, mean deviation, range	coefficient of variation
Measures of association	coefficients of contingency: Pearson, Cramer, Hellwig, Tschuprow, etc.	Kendall's t coefficient of correlation, Kendall and Smith coefficient of concordance	Pearson linear coefficient of correlation, correlation ratio, coefficient of part-correlation, simple regression	
Inferential tests	chi-square	nonparametric tests (sign test, runs test, Kolmogorov-Smirnov test)	Parametric tests (F-variance ratio test,t-Student test; test on regression coefficient, test on difference between means)	

Classification of univariate and bivariate methods of data analysis
from the point of view scales of measurement

Multivariate statistical methods in business research

Are some of the variables dependent on others?

Yes — Dependence methods

No — Interdependence methods
— Cluster analysis
— Linear ordering methods
— Multidimensional scaling
— Factor analysis

Number of depend variables

More than one / **One**

The scale level of dependent variables

The scale level of dependent variable

Interval, ratio — Nominal — Ordinal — Interval, ratio

The scale level of independent variables

Interval, ratio — Nominal — Interval, ratio — Nominal — Interval, ratio — Nominal

Canonical correlation

Discriminant analysis

Conjoint measurement

— Analysis of variance and covariance
— Automatic interaction detection

Multivariate analysis of variance and covariance

Multiple regression

The following relations are allowed for the respective scales:

— **nominal scale, relations: „equal to", „not equal to"**

— **ordinal scale, relations: „equal to", „not equal to", „greater than", „smaller than"**

— **interval scale, relations: „equal to", „not equal to", „greater than", „smaller than", equality of differences, eqality of intervals;**

— **ratio scale, relations: „equal to", „not equal to", „greater than", „smaller than", equality of differences, eqality of intervals, equality of ratios**

SCALES OF MEASUREMENT OF BUYER ATTITUDES

➤ **Basic scales:**
  - ➤ Nominal scale
  - ➤ Positional scale (rating scale)
  - ➤ The ranked scale
  - ➤ the scale of fixed sums
  - ➤ scale purchase intentions
  - ➤ paired comparison scale

➤ **Specific scales:**
  - ➤ Semantic scale (verbal differentiation)
  - ➤ Stapel scale
  - ➤ Likert scale

NOMINAL SCALE FOR MEASUREMENT OF BUYER ATTITUDES

➤ **On this scale attitude buyers are classified into two or more categories between which there are only relations of equality and variety**

➤ **For example, nominal scale is formed with answers to the question:**
  - ➤ Are you an advocate of ban on using a telephone while driving a car?
    - ➤ Yes
    - ➤ No
    - ➤ I have no opinion

RATING SCALE FOR MEASUREMENT OF BUYER ATTITUDES

➢ **On this scale attitude buyers are classified into two or more categories between which there are only relations of equality and variety**

➢ **For example, nominal scale is formed with answers to the question:**

   ➢ **Are you an advocate of ban on using a telephone while driving a car?**

      ➢ **Yes**

      ➢ **No**

      ➢ **I have no opinion**

SCALES FOR MEASUREMENT OF BUYER ATTITUDES

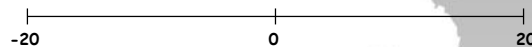**Satisfaction with the comfort of driving a certain car**

A – Ordinal scale with graphic (pictorial) form

B - Ordinal scale with verbal form

Highly unsatisfied   Unsatisfied   Neither satisfied nor unsatisfied   satisfied   Highly satisfied

C – Interval scale with graphic (numerical) form

-20   0   20

SCALES FOR MEASUREMENT OF BUYER ATTITUDES

Satisfaction with the comfort of driving a certain car

D - Ratio scale with graphic (numerical) form

0% •————————————————————————————• 100%

Highly unsatisfied   Highly satisfied

THE RATING SCALE

➢ **On this scale, which is an example of an ordinal scale, respondents are asked to rank the objects by giving them a rank which are successive natural numbers**

  ➢ **E.g. Arrange the following types of beer, from a brand that you think is best (rank 1) to the brand that you think is the worst (rank 7)**

Beer brand	Rank
Beer brand A	
Beer brand B	
Beer brand C	
Beer brand D	
Beer brand E	
Beer brand F	
Beer brand G	

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THE FIXED SUMS SCALE

➢ On this scale, which is an example of an ordinal scale, respondents are asked to divide a fixed sum of points (usually 100), percentage or fixed amount of money in accordance with its preference to objects due to the test feature

  ➢ E.g. Please specify the percentage, according to your preference to object in acordance with to what extent the advertising media is informative, funny, boring and annoying. Please make a division in such a way that the sum was 100 percent

Compared advertising media	Instructive	Amusing	Boring	Irritating	Sum (100%)
Radio					
Television					
Newspapers					
Billboard					

THE PAIRED COMPARISON SCALE

➢ This technique consists in comparing objects, due to a feature of all pairs of objects for a given set of objects. For N objects, the number of all pairs of objects is 0.5 N(N-1)

➢ Results of paired comparison of objects is compiled in the form of a matrix of dimensions N x N

  ➢ E.g. Using own criteria please assess the degree of similarity of each pair of advertising media due to their impact on buyers. Please submit your assessment on a five points scale, where 1 means that advertising media are very similar, and 5 means that advertising media are not similar at all. The choice of the degree of similarity please mark with the "X" in the appropriate box

COMPARED ADVERTISING MEDIA	Very similar				Not similar
Television and Radio					
Television and Newspapers					
Television and Billboard					
Radio and Newspapers					
Radio and Billboard					
Newspapers and Billboard					

THE SCALE OF INTENT TO PURCHASE

➢ **The variable is measured on the scale:**

  ➢ **RATIO; when respondents are asked to determine the subjective probabilities to buy individual goods or services**

  ➢ **INTERVAL; when respondents are asked to express their attitudes towards particular products or services on the ordinal scale. Values may include the range [0; 20], where extreme values are respectively: certainly do not buy, and certainly buy**

THE SCALE OF INTENT TO PURCHASE

➢ **The variable is measured on the scale:**

  ➢ **ORDINAL; when respondents are asked to rank the products or services of confidence purchase, for example:**

    1 - I will buy
    2 - Very likely that I will buy
    3 - Probably I will buy or I will not buy
    4 - Very likely that I will not buy,
    5 - Certainly I will buy

THE STAPEL SCALE OF INTENT TO PURCHASE

➤ This scale is a variation of the semantic scale. Is its simplification in the sense that it shows the intensity and direction of attitudes and for its construction is sufficient only the names of ordinal variables without the need to search antonyms. The ordinal variables are expressed usually 6-10 point scale, for example: +5, +4, +3, +2, +1, -1, -2, -3, -4, -5

  ➤ E.g. Please express your opinion on a shop X (3 is the highest and -3 means the lowest assessment)

Nicely and smartly composed		Stands out among other		Long remain in the memory		Easily noticeable by good lighting	
+3		+3		+3		+3	
+2		+2		+2		+2	
+1		+1		+1		+1	
-1		-1		-1		-1	
-2		-2		-2		-2	
-3		-3		-3		-3	

THE LIKERT SCALE OF INTENT TO PURCHASE

➤ This scale is an example of an ordinal scale. It contains defined set of (generally several tens) statements about the examined object. The task of respondents is to select the category on ordinal scale, which corresponds to his attitude toward an affirmation of the examined object

  ➤ E.g. Please select the category ordinal scale, which corresponds Mr. (Mrs.) attitude toward a particular conclusion. The answer, please mark with "X" in the appropriate box

Statement	I totally agree	I agree	I do not know	I do not agree	I entirely do not agree
When buying a chocolate bar, I draw attention to its weight and calorific value					
Usually I buy chocolate bars, which had not tried yet					
Information from the ads help me make a buying decision					
In-store promotion has little influence on my decision to buy a particular bar					
I believe that students should buy bars of local producers					

THE SEMANTIC SCALE OF INTENT TO PURCHASE

➢ On this scale, the researcher defines a set of variables describing the objects under measurement on an ordinal scale (typically 7-grade), which set out the ends of the scales in the form of antonyms, for example. Cheap - expensive, slow - fast, obsolete - a modern, etc. The task of respondents is to select the category for each highlighted an ordinal variable that corresponds to his attitude toward the tested object

  ➢ E.g. Sample evaluation of Pepsi beverage made by one respondent

	PEPSI							
The high content of fruit		X						The low content of fruit
Low saturation with carbon dioxide					X			High saturation with carbon dioxide
The high calorific value	X							The low calorific value
Bitter						X		Bitter
Quenches thirst		X						Does not quenches thirst
Popular drink			X					Not popular drink
Strong aftertaste	X							Dos not leave strong aftertaste
Not refreshing drink			X					Refreshing drink

THE PROBLEMS ARISING WHILE CONSTRUCTION SCALES OF INTENT TO PURCHASE

➢ In the construction of scales measuring attitudes a lot of problems arise. These can be distinguished, such as:

  ➢ The number of category scale; usually 5 to 7. more categories do not guarantee better precision. The sugestion is to keep the number of categories as low as possible

  ➢ Odd or even number of categories. The middle category is considfered neutral, but very often as a proxy for I DO NOT KNOW

  ➢ The balanced or unbalanced scale. The same number of positive and negative categories is not always advisible

  ➢ Scales forcing or not. By entering the category neutral - do not know, respondent considers it easier to answer

  ➢ Scales with the reference unit and scales without reference unit. Respondnet is asked to express attitude toward products X, comparing it to an reference (ideal) product Y

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THE PROBLEMS ARISING WHILE CONSTRUCTION SCALES OF INTENT TO PURCHASE

➢ In the construction of scales measuring attitudes a lot of problems arise. These can be distinguished, such as:
  ➢ Form of presentation scale
    ➢ Graphical
    ➢ Verbal
    ➢ Numerical
    ➢ Combined method

REPRESENTATIVE METHOD OF UNITS SELECTION

➢ A method of conducting statistical research whre a part, has representative character, that is, such that the results of part research can be generalized to the whole considered population

➢ A representative method lies in the fact that:
  ➢ In order to investigate the statistical properties of the entire population selected for testing only a certain number of statistical units representing the population are measured

REPRESENTATIVE METHOD OF UNITS SELECTION

➢ **A representative method lies in the fact that:**
  - ➢ **This select group of individuals called THE SAMPLE**
  - ➢ **The main problem in the application of this method is selection representative (suitable) group of individuals to be measured**
  - ➢ **These units should be selected so that actually represent the entire community, or so that the sample was a miniature reflection of the surveyed population**

REPRESENTATIVE METHOD OF UNITS SELECTION

➢ **The General population - a finite community, the researcher wants to obtain specific data of its members**

➢ **A representative method lies in the fact that:**
  - ➢ **The study may be:**
    - ➢ Comprehensive - covering the entire study population (each unit);
    - ➢ Partial; not exhaustive, for not exhaustive study the sampling is necessary, i.e. selection of representative set of units (the sample) where research will be conducted

REPRESENTATIVE METHOD OF UNITS SELECTION

➤ THE SAMPLE - the sub population selected for measurement in such a way, it represent the whole population

➤ To investigator can actually after the completion of the study rightly conclude on population, provided the sample has representativeness characteristics
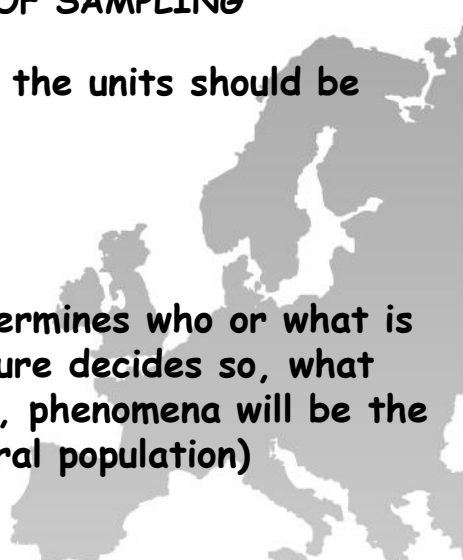
REPRESENTATIVE METHOD OF UNITS SELECTION

➤ Determining the partial (representative) study needs to take three decisions:
  ➤ Who (which unit) is to be tested (measured), i.e. how to determine which will be in the sample?
  ➤ How many objects should be tested (what will be the size of the sample)?
  ➤ How to select objects in the sample (which the sampling method used)?

THE PROCESS OF SAMPLING

➢Determination (definition) of the general population

➢Determination of the sampling frame (general population members list, if any)

➢The selection (defining) the unit

➢The choice of the method for selecting units

THE PROCESS OF SAMPLING

➢Three fixed features of the units should be always determined
  ➢Factual
  ➢Temporal
  ➢Spatial

➢The factual feature determines who or what is being studied. This feature decides so, what group of people, objects, phenomena will be the general community (general population)

THE PROCESS OF SAMPLING

➢**Feature Time - specifies from which period (or point in time) the measurement values will be used**

➢**Feature space - determines which area; territory, economic or administrative units should be incorporated into the general population and thus into sample**

THE PROCESS OF SAMPLING

➢**The fact that the fixed features are the same for all units of the statistical population means that they are not tested**

➢**An indispensable feature of the community (general population) is occurrence of at least one characteristic differentiating internally this community (variable characteristics)**
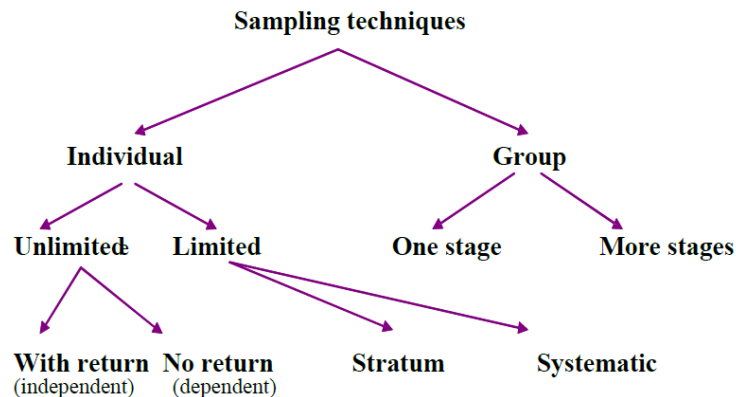
THE SAMPLING LIST

➢ **Regardless of the physical form of the sampling list, it should meet the following conditions:**
  - ➢ **Completeness; sampling list should include all units of the population**
  - ➢ **Up-to-date; the information on units contained in sampling list must be current**
  - ➢ **Traceability; it should be possible to find a selected sample unit in the population**

➢ **It is rare that the sampling list meet all the requirements. Existing differences are a source of errors related to the list**

THE SAMPLING SCHEME

➢ **The sampling scheme is the process of selecting one after the other units from the population with a predetermined set of selection probabilities for individual units in each drawing**

SAMPLING SCHEMES


```
                    Sampling techniques
                    /               \
              Individual            Group
              /      \              /      \
        Unlimited   Limited    One stage   More stages
        /     \        \    \
  With return  No return  Stratum  Systematic
  (independent) (dependent)
```

THE SAMPLING SCHEME

➢ Optimal stratified random selection
➢ For optimal allocation shall be considered the selection of individuals from different layers of the sample, which is:
  ➢ Proportional to the product of the number of layers and the size of the standard deviation of the characteristic in a given layer, and
  ➢ Inversely proportional to the square root of the cost of the testing entity belonging to the layer

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THE TYPES OF ERRORS THAT OCCUR DURING THE MEASUREMENT

➢ **The error types**
  ➢ **Random - are associated with the sampling procedure, depend on the occurrence of a result other than to suggest parameters, these errors are dependent on the applied research scheme**
  ➢ **Non-random - occur as a result of individual measurement or as a result of information processing; can be divided into errors:**
    ➢ **Non systematic (the error value does not increase with increasing number of observations)**
    ➢ **Systematic (the error value increase with increase of the number of observations)**

THE TYPES OF ERRORS THAT OCCUR DURING THE MEASUREMENT

➢ **Non random; systematic**
  ➢ **eg. the errors in population specification**
    ➢ The general population definition is wrong, or,
    ➢ The units definition included in general population is wrong
    Error at this point causes errors in the later stages.
  ➢ **Sample selection error. Operationalization of the research involves selecting the wrong test sample.**
  ➢ **Selection bias - happens in non-random selection, the interviewer selects the preferred units, the wrong choice of units for testing**
  ➢ **Sampling list error – list does not contain all the elements of the general population or is out of date**

THE TYPES OF ERRORS THAT OCCUR DURING THE MEASUREMENT

➤**Non random; systematic**
  ➤**Lack of response error - the units are elusive, do not give a response at the poll**
  ➤**Measurement error - different sources of error, e.g.**
    ➤ **Bad question in the questionnaire (obscure, non understandable)**
    ➤ **Misinterpretation, and thus the wrong answer**
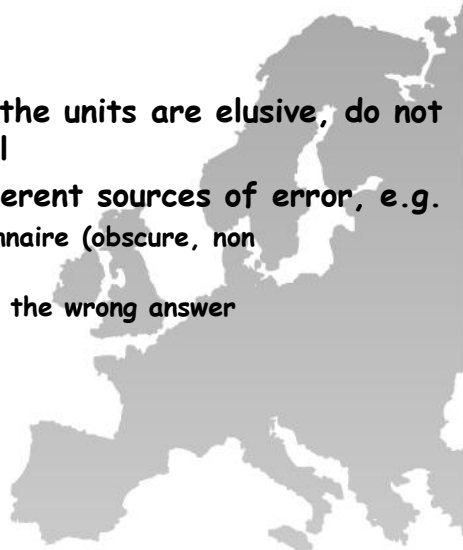   ➤ **Bad coding**

Table 1.1. Probabilities generated by Benford's Law.

Digit	Position in number			
	1st	2nd	3rd	4th
0	–	0,11968	0,10178	0,10018
1	0,30103	0,11389	0,10138	0,10014
2	0,17609	0,10882	0,10097	0,10010
3	0,12494	0,10433	0,10057	0,10006
4	0,09691	0,10031	0,10018	0,10002
5	0,07918	0,09668	0,09979	0,09998
6	0,06695	0,09337	0,09940	0,09994
7	0,05799	0,09035	0,09902	0,09990
8	0,05115	0,08757	0,09864	0,09986
9	0,04576	0,08500	0,09827	0,09982

Source: [Nigrini 1996, p. 74].