



**SLEZSKÁ  
UNIVERZITA**

OBCHODNĚ PODNIKATELSKÁ  
FAKULTA V KARVINĚ

# Research methods II

Master thesis seminar

28.11.2023



# Content

- 1. Analysing qualitative data**
- 2. Statistical analysis of quantitative data**
- 3. Writing convincing conclusions**
- 4. Presentation skills**



**1**

# **Analysing qualitative data**



# Short recap

Quantitative data	Qualitative data
Based on meanings derived from numbers	Based on meanings expressed through words (spoken and textual) and images
Collection results in numerical and standardised data	Collection results in non-standardised data requiring classification into categories
Analysis conducted through the use of diagrams and statistics	Analysis conducted through the use of conceptualisation
When using both quant and qual, we call the approach <b>mixed</b> method research design.	



# Analysing qualitative data

- Qualitative data are likely to be characterised by their richness and fullness, based on your opportunity to explore a subject in as real a manner as is possible.
- In qualitative research, meanings are principally derived from words and images, not numbers.
- Since words and images may have multiple meanings as well as unclear meanings, it is necessary to explore and clarify these with great care.



# Collecting qualitative data

- Qualitative data can be generated in many forms:
  - Archival and documentary research (secondary data)
  - Observations, surveys and interviews (primary data)
- Primary qualitative data are recorded and have to be **transcribed** later on.
  - As an interviewer, you would be interested not only in what participants said, but in the way they said it as well.
    - Tone of a voice
    - Facial expression
    - Body language



# Transcribing qualitative data - checklist

- ✓ Have you thought about how you intend to analyse your data and made sure that your transcription will facilitate this?
- ✓ Have you chosen clear interviewer and respondent identifiers and used them consistently?
- ✓ Have you included the interview questions in full in your transcription?
- ✓ Have you saved your transcribed data using a separate file for each interview?
- ✓ Does your filename maintain confidentiality and preserve anonymity while still allowing you to recognise important information easily?
- ✓ Have you checked your transcript for accuracy and, where necessary, 'cleaned up' the data?
- ✓ Have you stored a separate backup or security copy of each data file on your USB mass storage device or cloud?



# Analysing qualitative data

- There are some tools which can help you when analysing qualitative data:
  - interim or progress summaries;
  - transcript summaries;
  - document summaries;
  - self-memos;
  - research notebook;
  - reflective diary or journal.





# Qualitative data analysis: Example

- Research question: What is the approach to inventory management in the large XY company.
- 3 structured interviews with managers.
- Thematic analysis on qualitative data.



# Qualitative data analysis: Example

## 1. Familiarization with Data:

- Read through all the data thoroughly to become familiar with the content.

## 2. Generating Initial Codes:

- Systematically code the data, identifying features of the data that are interesting and relevant to the research question.

## 3. Searching for Themes:

- Collate codes into potential themes, gathering all data relevant to each potential theme.

## 4. Conclusion:

- Relate the analysis back to the research question and literature, providing a narrative that tells a story about the data.



# Qualitative data analysis: Interviews

- **Manager A:** "In our department, we've adopted a Just-in-Time (JIT) inventory system. Our focus is on efficiency and reducing waste. We coordinate closely with our suppliers to ensure that inventory is delivered exactly when needed. This approach minimizes storage costs and keeps our inventory levels low. We do face challenges in ensuring timely delivery and managing the risks associated with supply chain disruptions. However, we've found that with careful planning and strong relationships with suppliers, JIT is extremely effective for us."



# Qualitative data analysis: Interviews

- **Manager B:** "My team uses an ABC analysis approach for inventory management. We categorize inventory into three groups: A, B, and C, based on their importance and value. 'A' items are high-value with low frequency of use, 'B' items are moderate in value and use, and 'C' items are low-value but high frequency. This method helps us optimize our inventory by focusing more resources on the most valuable items. We invest in advanced tracking and analytics to monitor these categories and adjust our strategy accordingly. This method has significantly improved our inventory turnover and reduced carrying costs."



# Qualitative data analysis: Interviews

- **Manager C:** "Our approach is centered around detailed demand forecasting and maintaining safety stock. We use historical sales data, market trends, and predictive analytics to forecast future demand accurately. Based on these forecasts, we maintain a certain level of safety stock to cushion against unexpected demand spikes or supply issues. This approach requires a delicate balance – too much safety stock increases holding costs, while too little risks stockouts. We're continuously refining our forecasting models to improve accuracy. This strategy has been effective in ensuring product availability and customer satisfaction."



# Qualitative data analysis: Interviews

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**Themes: Efficiency Optimization, Risk Management, Data-Driven Decision Making, Cost-Benefit Balance**



# Qualitative data analysis: Interviews

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# Qualitative data analysis: Interviews

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- **Themes:** Efficiency Optimization, Risk Management, Data-Driven Decision Making, Cost-Benefit Balance





# Qualitative data analysis: Interviews

- **Conclusion:**
- The thematic analysis reveals that inventory management in a large company involves a multifaceted approach. Managers prioritize efficiency, but also recognize the importance of risk management, especially in systems like JIT. The use of data-driven strategies, such as ABC analysis and demand forecasting, highlights the shift towards analytics in inventory management. Balancing cost and benefits is a recurring theme, as managers aim to optimize inventory levels while ensuring customer satisfaction and minimizing costs.



**2**

# **Statistical analysis of quantitative data**



# Statistical analysis of quantitative data

- Quantitative data in a raw form, that is, before these data have been processed and analysed, convey very little meaning to most people.
- These data, therefore, need to be processed to make them useful, that is, to turn them into information.
- Quantitative analysis techniques such as tables, graphs and statistics allow us to do this, helping us to explore, present, describe and examine relationships and trends within our data.



# Types of data

- **Categorical**

- Categorical data refer to data whose values cannot be measured numerically but can be either classified into sets (categories) according to the characteristics that identify or describe the variable or placed in rank order.

- **Numerical**

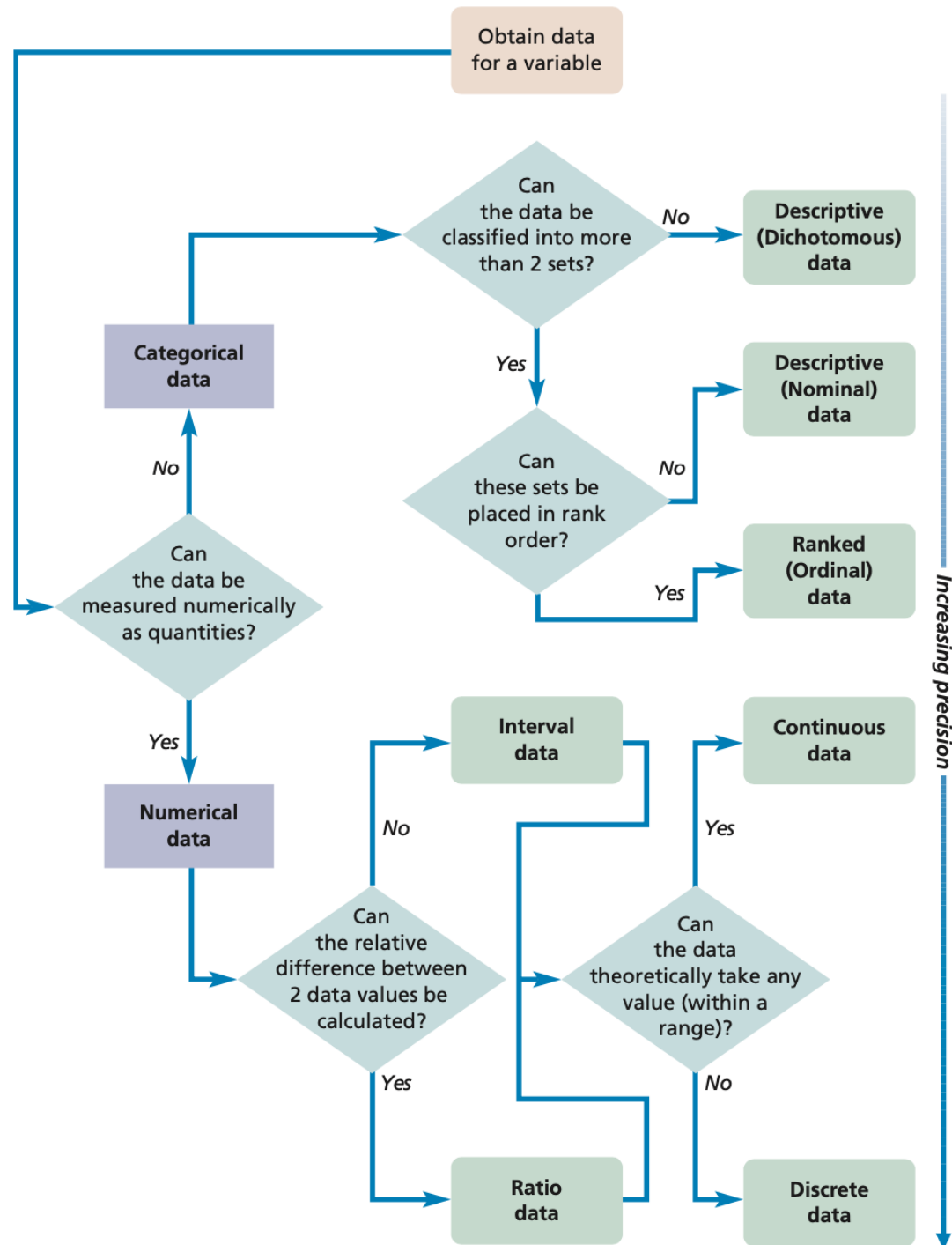
- Numerical data are those whose values are measured or counted numerically as quantities.



# Types of data

- Categorical
  - Nominal (descriptive) data
  - Ordinal (ranked) data
- Numerical
  - Interval data
  - Ratio data





Increasing precision



	Description: what is it?	Order: What is more and what is less	Distance: How much bigger is one than the other	Relative difference: What is a ratio between two values	Examples
Nominal	✓	✗	✗	✗	Gender
Ordinal	✓	✓	✗	✗	Education
Interval	✓	✓	✓	✗	Temperature
Ratio	✓	✓	✓	✓	Profit

# Descriptive statistics

- It is essentially a description of the quantitative data collected.
- We describe the individual variables, yet **separately** from the other variables.
- **The variable** is, for example, customer satisfaction
- **The categories of values** are variations of the scores on the scale (for example: very satisfied, satisfied, dissatisfied, very dissatisfied)





# Descriptive statistics

- **Modus** - the value of the response with the highest frequency
- **Median** - the middle value in an ascending order of values
- **Mean** - the arithmetic mean is also used only for numeric variables - interval or ratio and is influenced with outliers compared to the median.
- **Quantiles** - divide an ordered set into  $n$  parts in ascending order of values. Quartiles are most commonly used, dividing the set into 4 parts. We know 25% quartiles (lower or first) and then 75% (upper or also third).



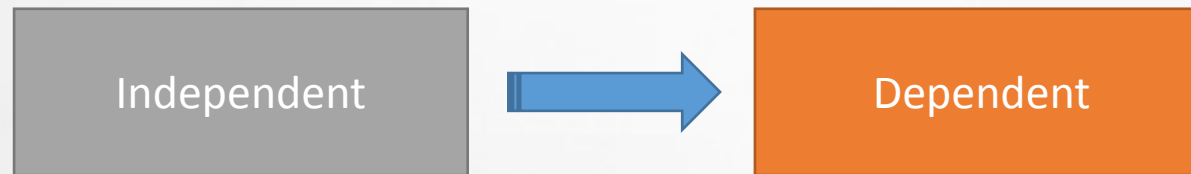
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# Types of variables

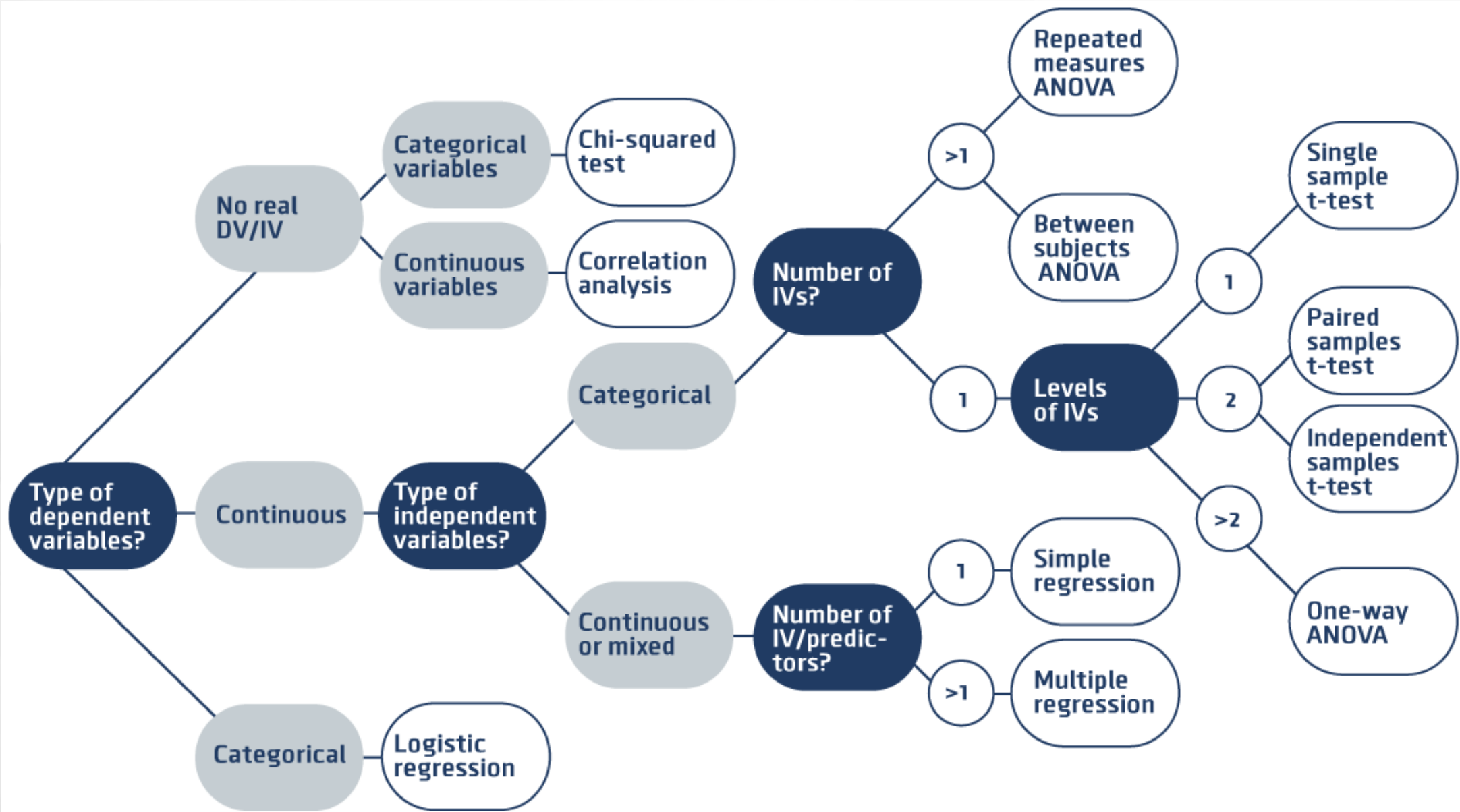
- There are two basic types of dependent variables:
  1. The first is the **dependent variable**, which, as the name implies, is influenced by another variable. Thus, we expect changes due to a change in the independent variable.
  2. The second is an **independent variable** that influences another variable.



# Statistical methods

- Knowing types of data and variables one can select a statistical test to be used.
- What type of data is dependent variable?
- What type of data is independent variable?





# Chi-Square

- It is based on the logic of a contingency table that compares two variables against each other.
- The variables are ideally nominal or ordinal.
- The underlying version of the statistical method is based on a 2x2 matrix, where each variable takes two values.
- Beyond simple contingency, chi-square allows comparison of expected frequency and observed frequency. This essentially reveals the relationships that are present in the data.
- Both contingency tables and chi-squares can be processed in Excel and other statistical programs such as SPSS.

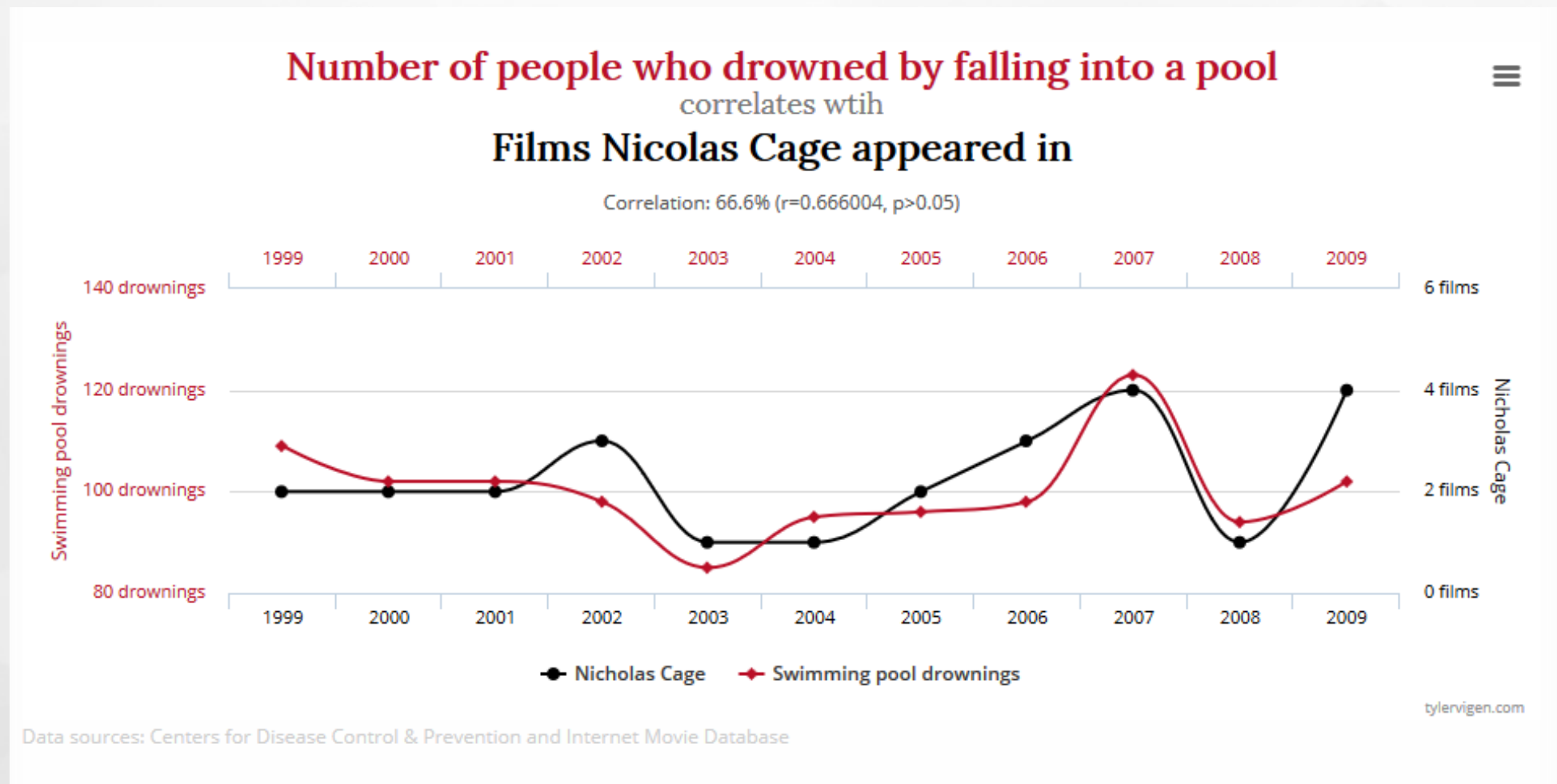


# Correlation analysis

- Expresses the degree of association between two variables in the data matrix. These variables should ideally be at least cardinal.
- Correlation measures the closeness of the relationship, i.e. the interrelation of the variables, not causality. Correlation cannot reveal causality, that is, the causal relationship between two variables.
- The result of correlation analysis is in the form of a correlation coefficient, which takes values from -1 to 1 describing the strength of the association.
- It is widely used on its own, but it is also the basis for more advanced analyses such as factor analysis, etc.



# Correlation analysis



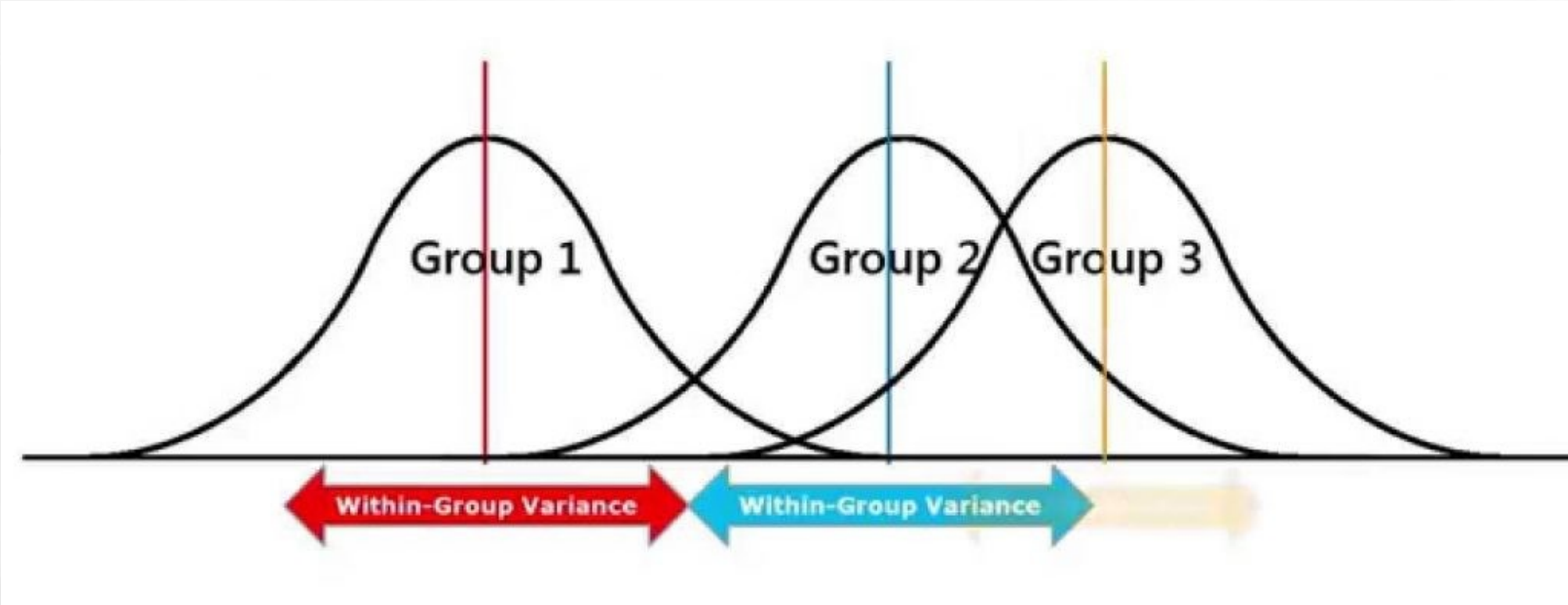


# Anova

- Abbreviation for the English term ANalysis Of Variance.
- Analysis of Variance - is nothing more than comparing the differences in variances of different variants.
- The nominal trait is the independent variable.
- The cardinal trait is the dependent variable.
- By comparing variances within groups, we determine whether the nominal variable has an effect on the cardinal variable.



# Anova

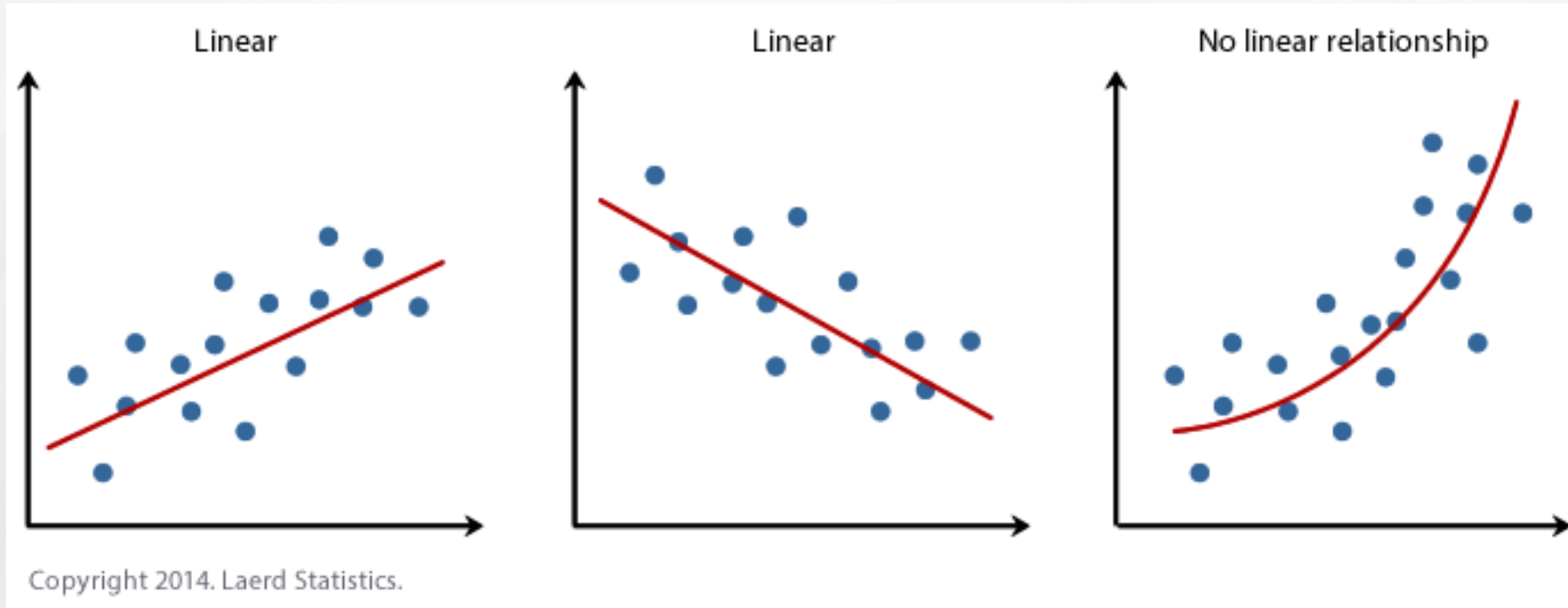


# Regression

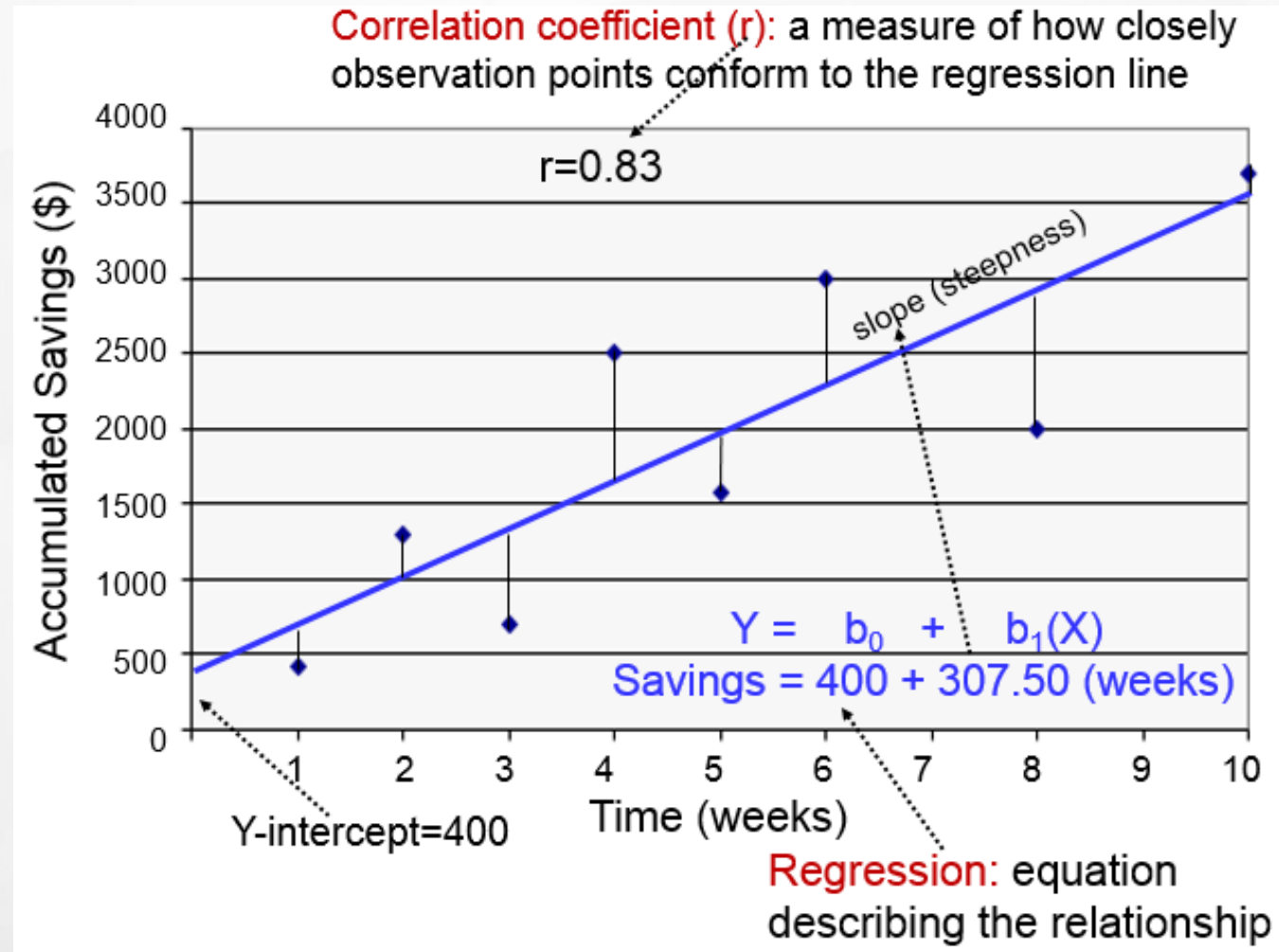
- Measuring the relationship between the dependent and independent variables
- A more accurate description of the relationship between variables
- The aim is to construct a regression function
- Multiple variables can be used
- Possibility to predict the evolution
- Interleave the data with a regression curve



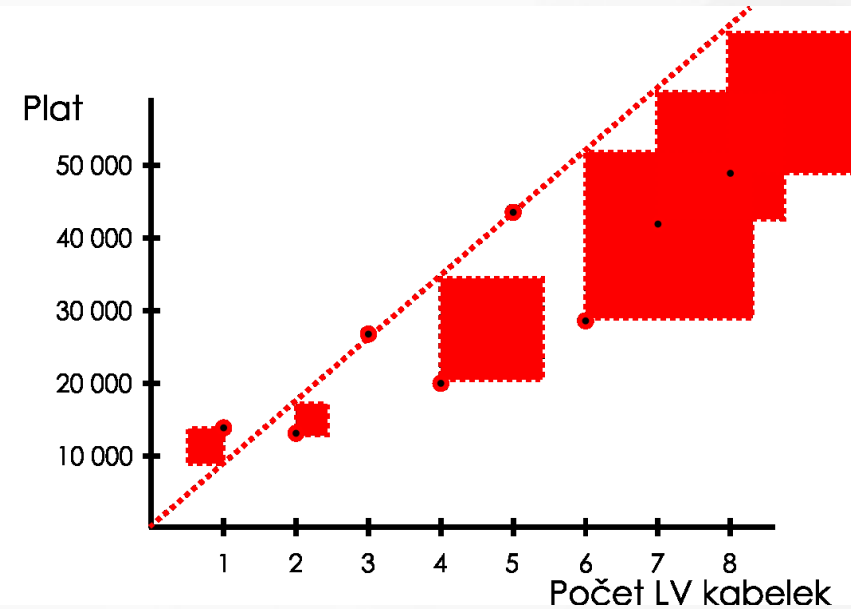
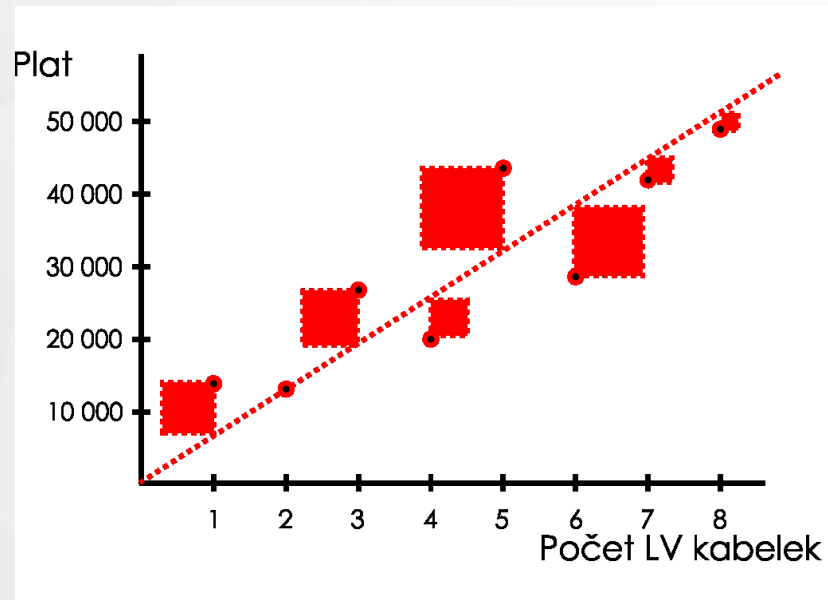
# Regression



# Regression and correlation



# Linear regression and least square method

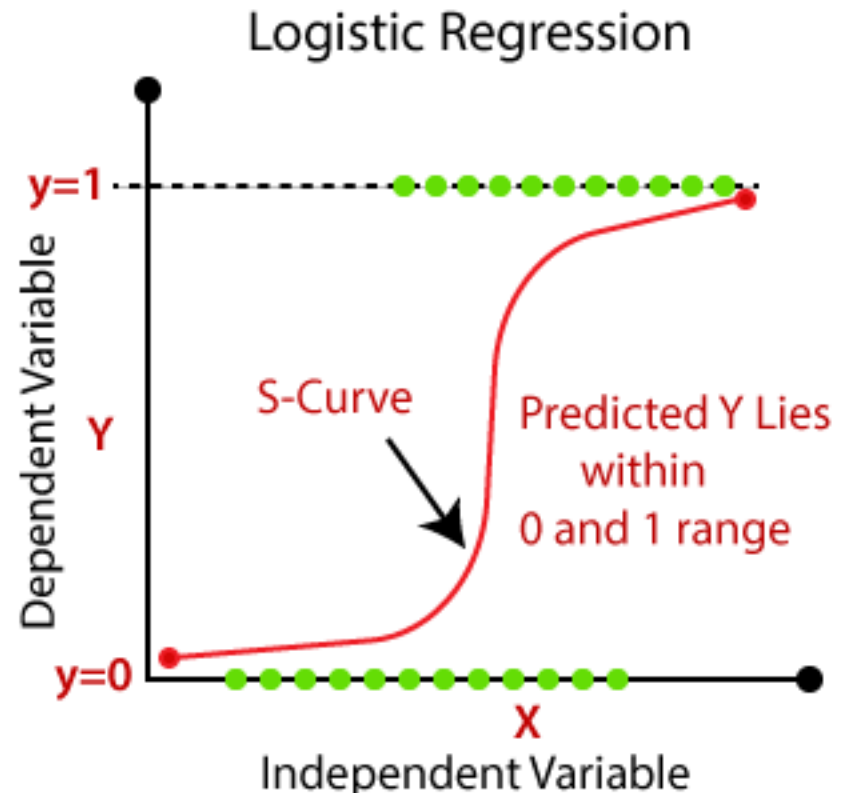
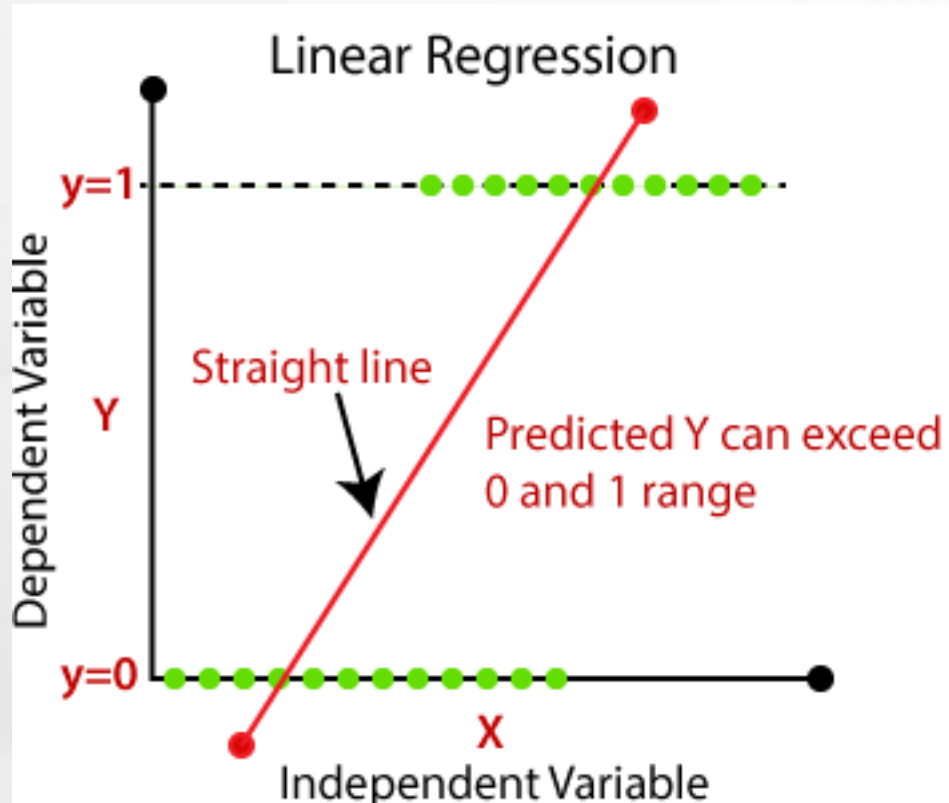


# Logistic regression

- Logistic regression is an extension of simple linear regression.
- Where the dependent variable is dichotomous or binary in nature, we cannot use simple linear regression.
- Logistic regression is the statistical technique used to predict the relationship between predictors and a predicted variable where the dependent variable is binary (e.g., sex, response , score, etc...)
- There must be two or more independent variables, or predictors, for a logistic regression, which can be continuous (interval/ratio) or categorical (ordinal/nominal).



# Logistic regression





# More methods

- T-test
- Cluster analysis
- Factor analysis
- MANOVA



**3**

## **Writing convincing conclusions**



# Convincing conclusions

- **Synthesize, Don't Summarize:**

- Instead of simply summarizing the chapters, synthesize the key findings or arguments to show how they come together to support your thesis.

- **Reflect on the Significance:**

- Clearly articulate the significance of your research, emphasizing its contribution to the field or company.



# Convincing conclusions

- **Address Limitations and Future Work:**
  - Acknowledge any limitations of your study and suggest potential areas for future research, demonstrating your critical thinking and understanding of the subject.
- **End with a Strong Final Thought:**
  - Conclude with a memorable final thought or statement that leaves a lasting impression and underscores the importance of your research.



4

## Presentation skills



# Less is more



- Resist the temptation to cram too much information, text, or complex graphics onto your slides.
- Overloaded slides can overwhelm your audience, making it hard for them to follow your main points.
- Stick to key points and use visuals effectively to complement your speech, not replace it.
- 7x7 rule.



# Practice makes perfect



- Avoid going into your presentation without sufficient practice.
- Familiarity with your material and the flow of your presentation is crucial.
- Practice helps in managing time effectively, smoothing transitions between topics, and refining your speaking pace and tone.
- Use your colleague students to be the judge in your practice sessions.



# Focus on audience



- Don't just focus on your slides or script; engage with your audience.
- Avoiding eye contact, not acknowledging the presence of your audience, or failing to gauge their reactions can make your presentation less effective.
- Interaction, even in subtle ways, helps in keeping the audience engaged.





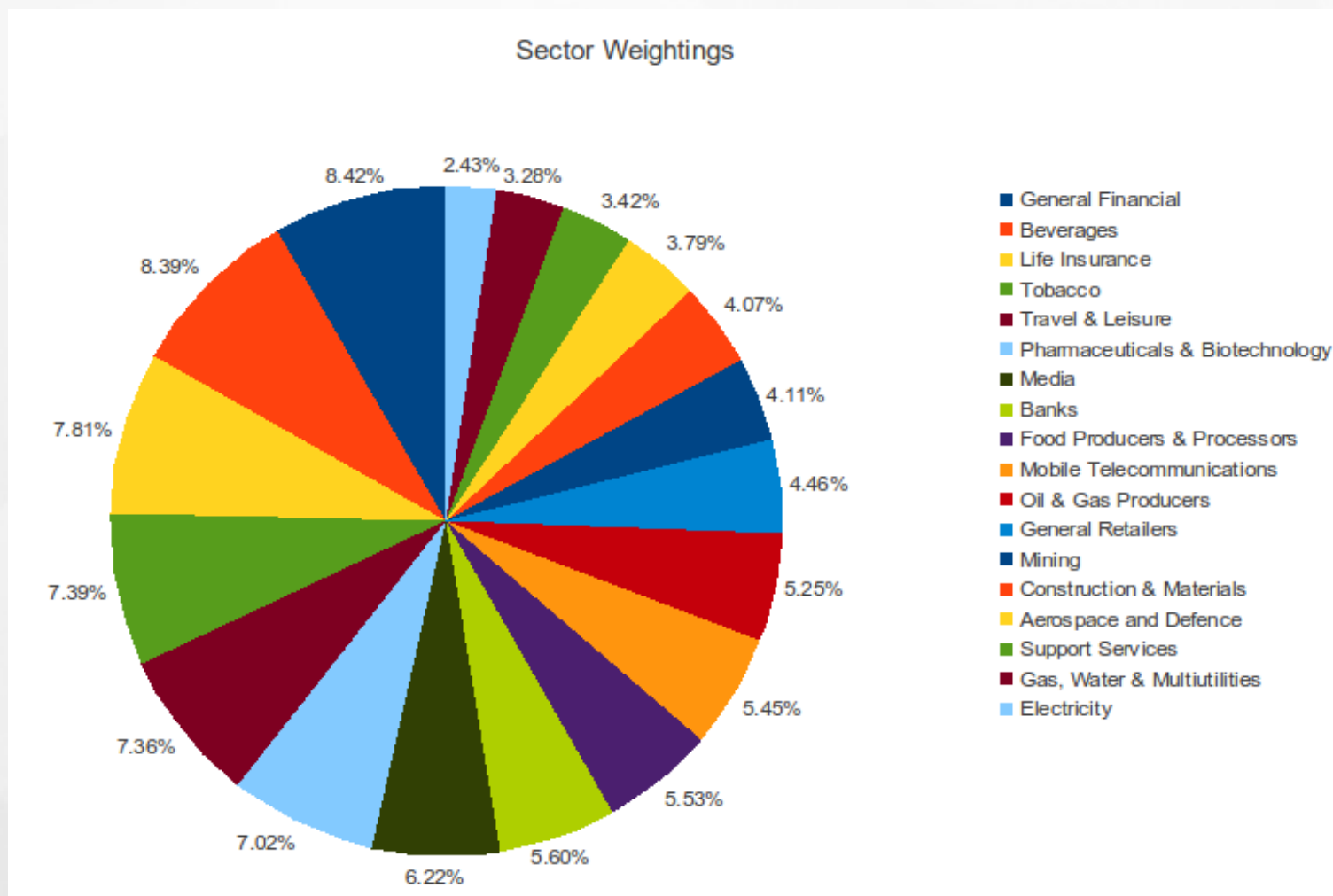
# Time is money



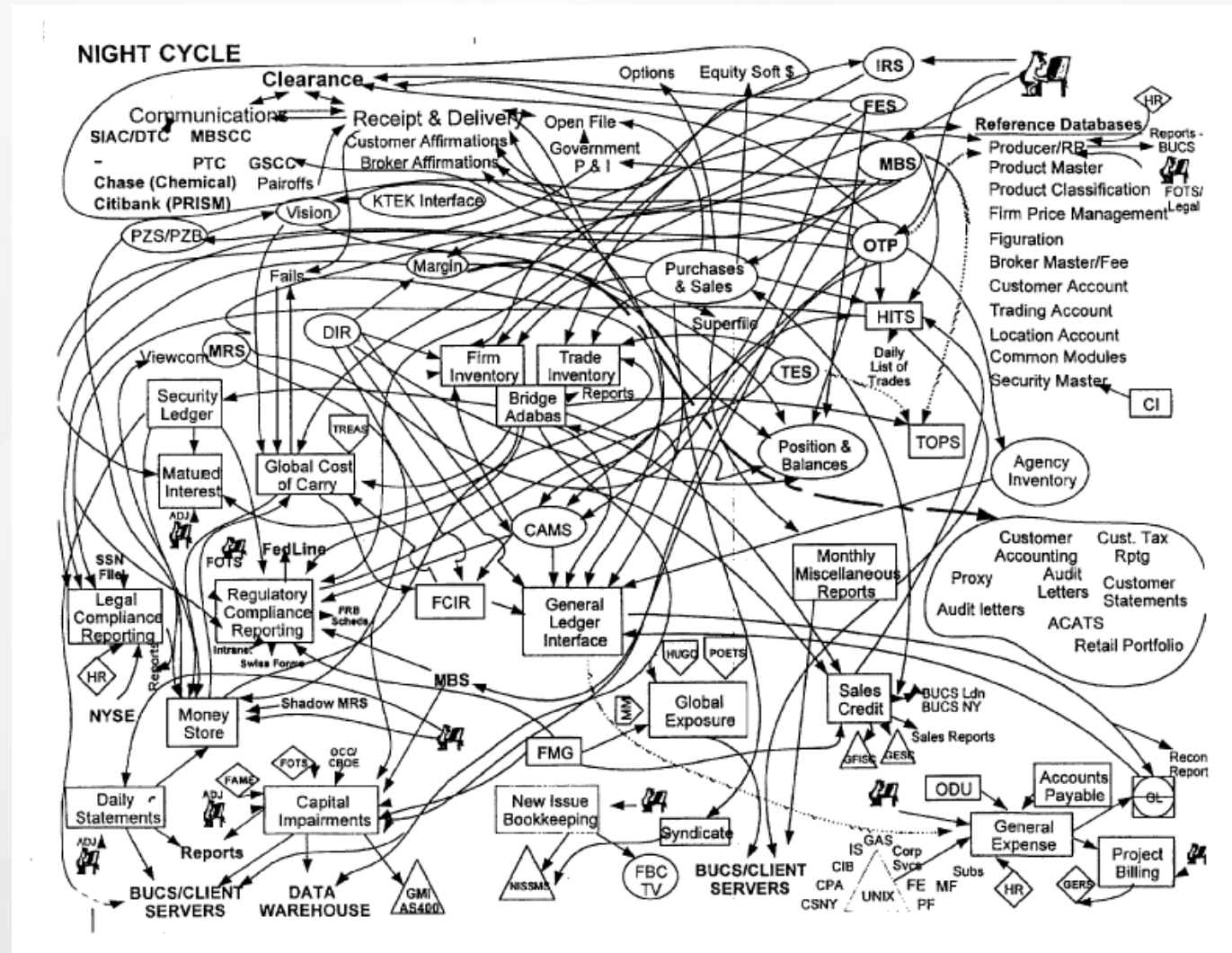
- Be mindful of the time allocated for your presentation.
- Running significantly over time can be as problematic as a presentation that is too brief.
- It shows a lack of preparation and respect for the audience's time.
- Ensure your presentation covers all key points within the allotted time.
- Practice with stopwatch



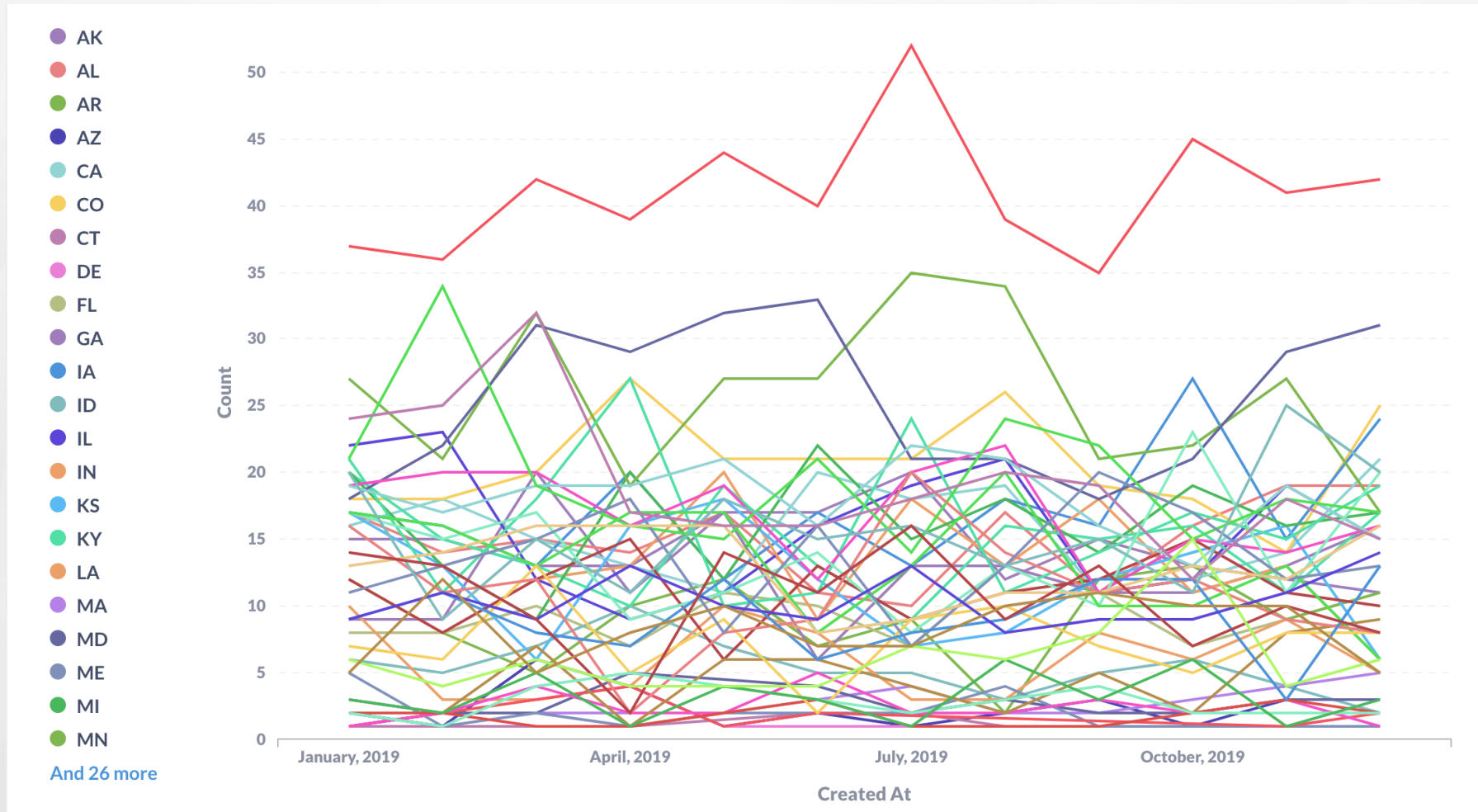
# Visual communication



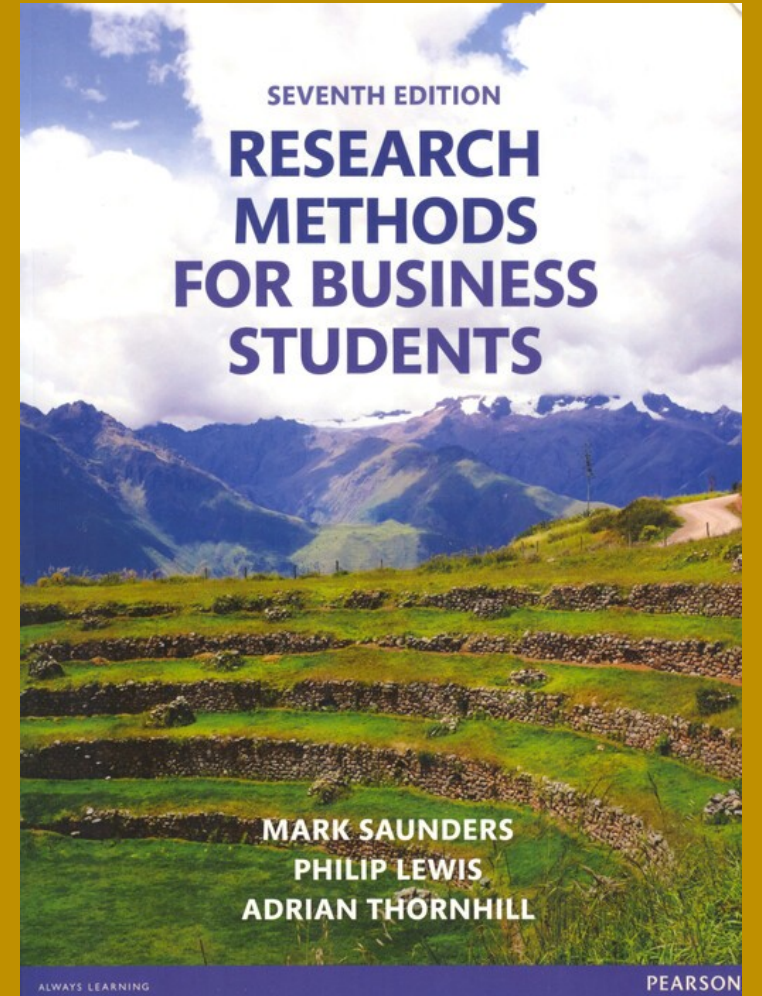
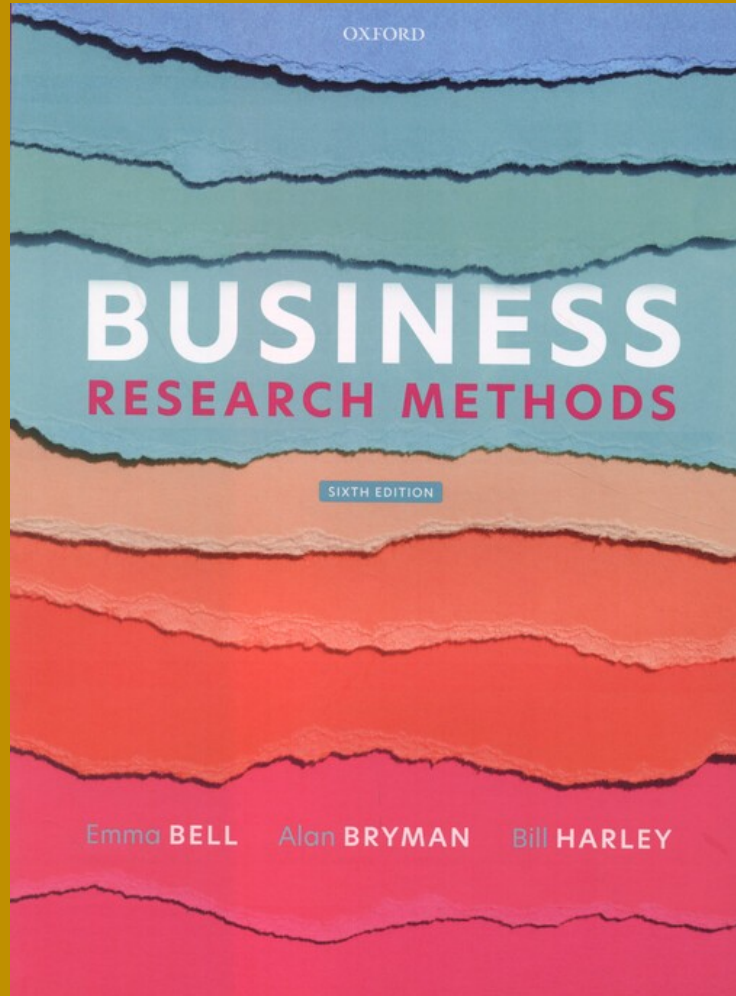
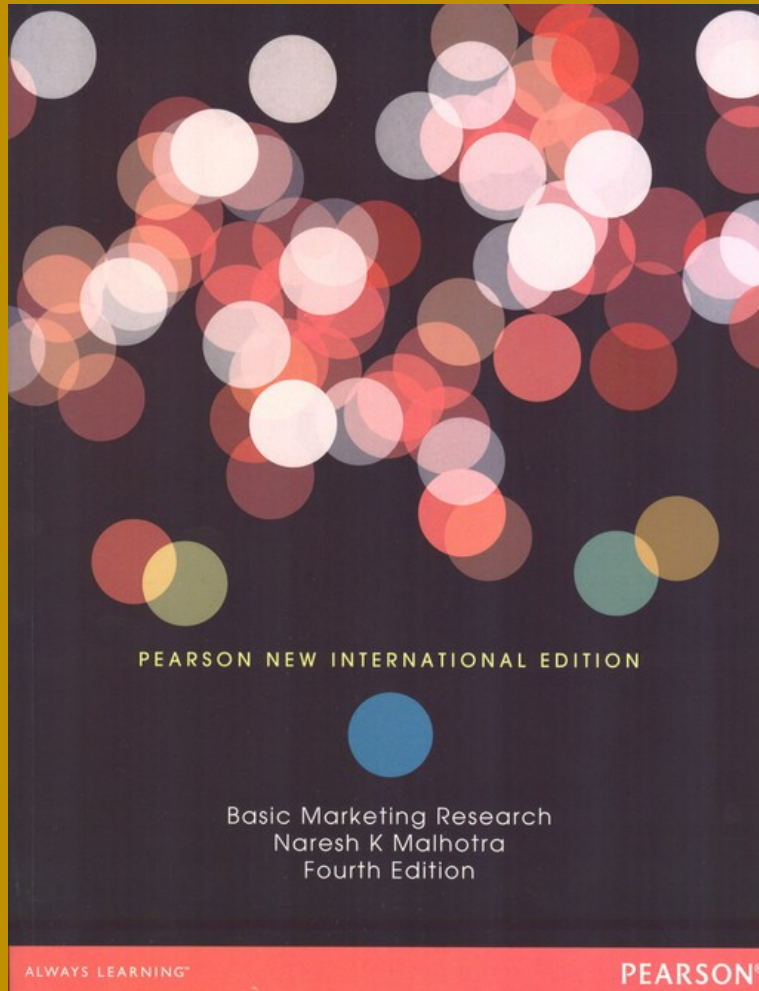
# Visual communication



# Visual communication



# More references





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**Thank you**

