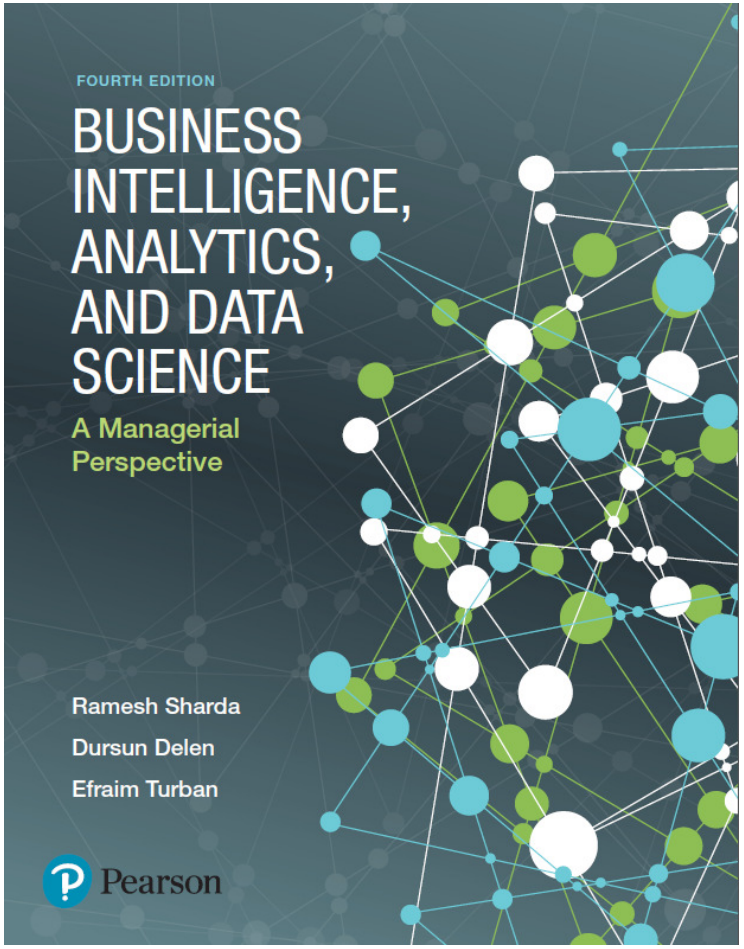
Business Intelligence, Analytics, and Data Science: A Managerial Perspective

Fourth Edition



Chapter 2 – Part C

Descriptive Analytics I: Nature of Data, Statistical Modeling, and Visualization

Pearson

Business Reporting Definitions and Concepts

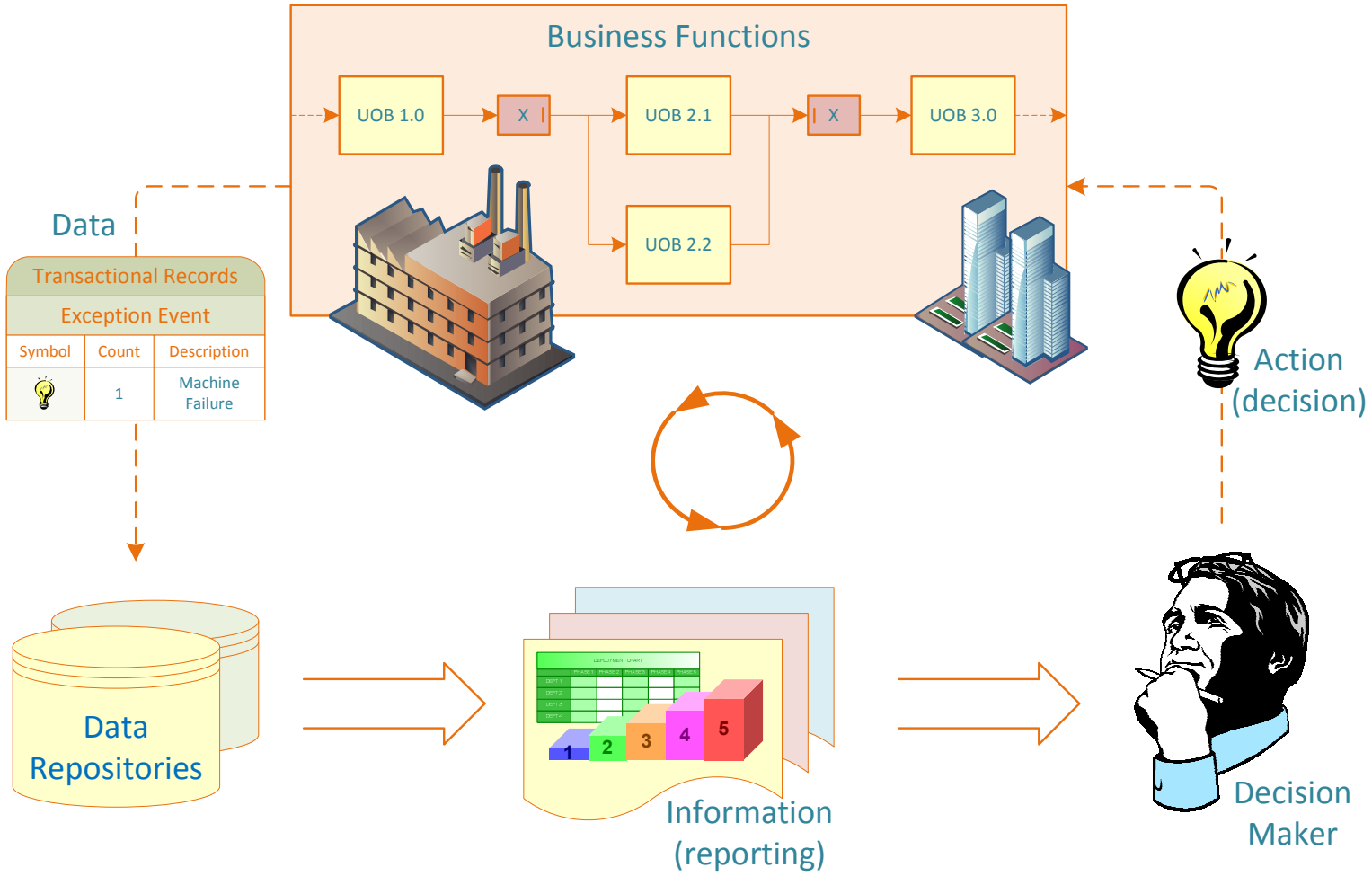
- Report = Information → Decision
- Report?
  - Any communication artifact prepared to convey specific information
- A report can fulfill many functions
  - To ensure proper departmental functioning
  - To provide information
  - To provide the results of an analysis
  - To persuade others to act
  - To create an organizational memory…

What is a Business Report?

- A written document that contains information regarding business matters.
- Purpose: to improve managerial decisions
- Source: data from inside and outside the organization (via the use of ETL)
- Format: text + tables + graphs/charts
- Distribution: in-print, email, portal/intranet

Data acquisition → Information generation → Decision making → Process management

Business Reporting



Types of Business Reports

- Metric Management Reports
  - Help manage business performance through metrics (SLAs for externals; KPIs for internals)
  - Can be used as part of Six Sigma and/or TQM
- Dashboard-Type Reports
  - Graphical presentation of several performance indicators in a single page using dials/gauges
- Balanced Scorecard–Type Reports
  - Include financial, customer, business process, and learning & growth indicators

Application Case 2.5
Flood of Paper Ends at FEMA

Questions for Discussion

1. What is FEMA, and what does it do?
2. What are the main challenges that FEMA faces?
3. How did FEMA improve its inefficient reporting practices?

Data Visualization

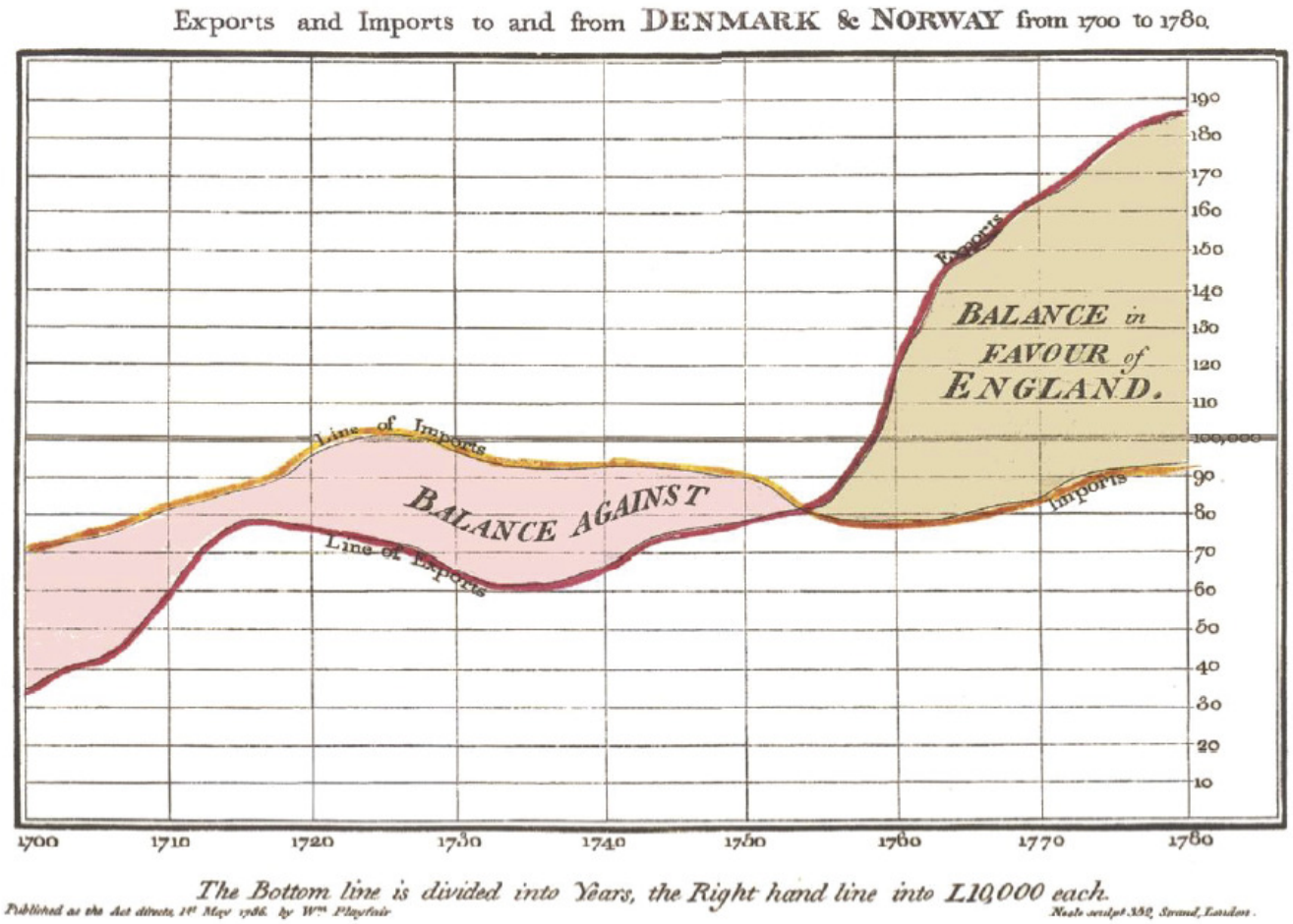
"The use of visual representations to explore, make sense of, and communicate data."

- Data visualization vs. Information visualization
- Information = aggregation, summarization, and contextualization of data
- Related to information graphics, scientific visualization, and statistical graphics
- Often includes charts, graphs, illustrations, …

A Brief History of Data Visualization

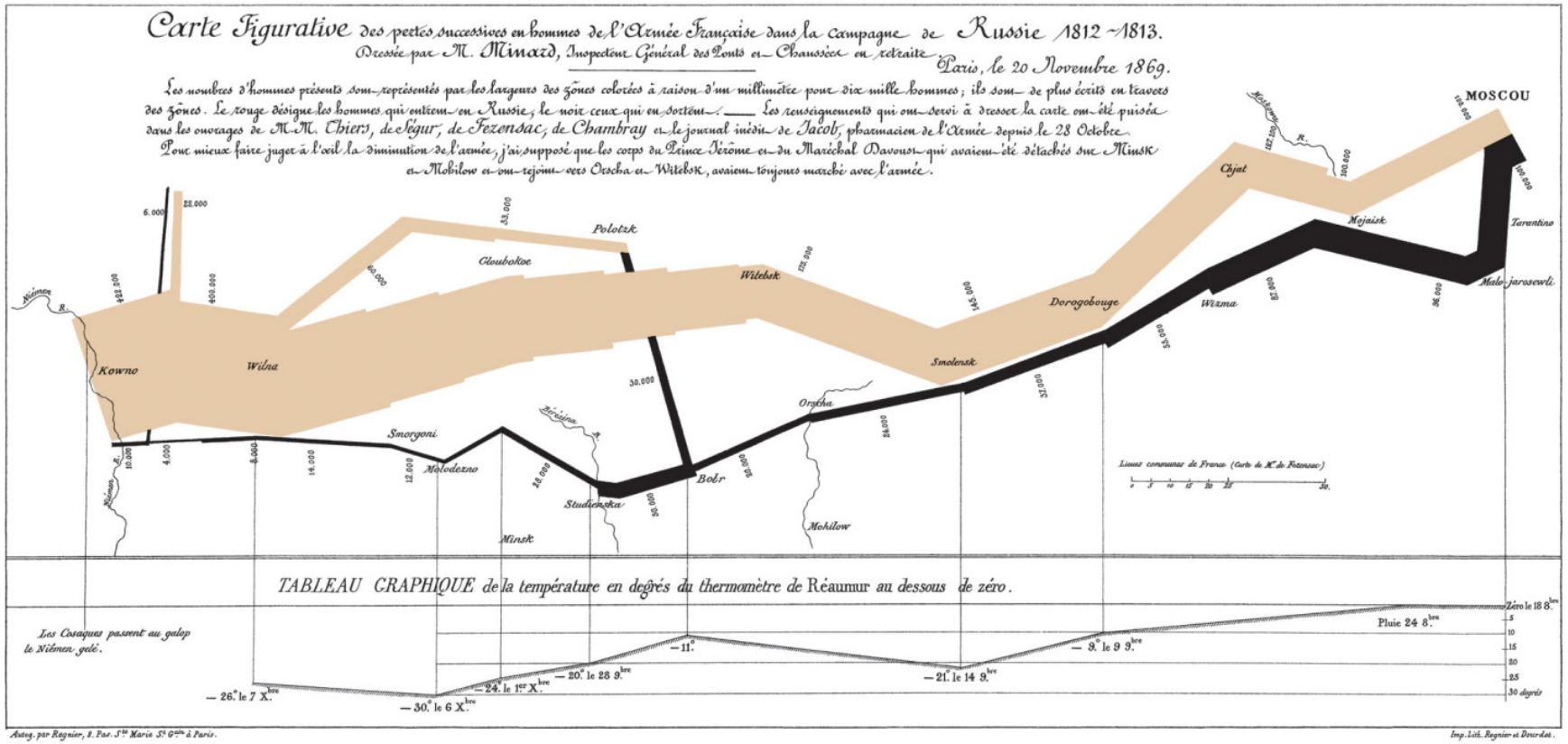
- Data visualization can date back to the second century AD
- Most developments have occurred in the last two and a half centuries
- Until recently it was not recognized as a discipline
- Today's most popular visual forms date back a few centuries

The First Pie Chart
Created by William Playfair in 1801



William Playfair is widely credited as the inventor of the modern chart, having created the first line and pie charts.

Decimation of Napoleon's Army During the 1812 Russian Campaign



By Charles Joseph Minard

- Arguably the most popular multi-dimensional chart

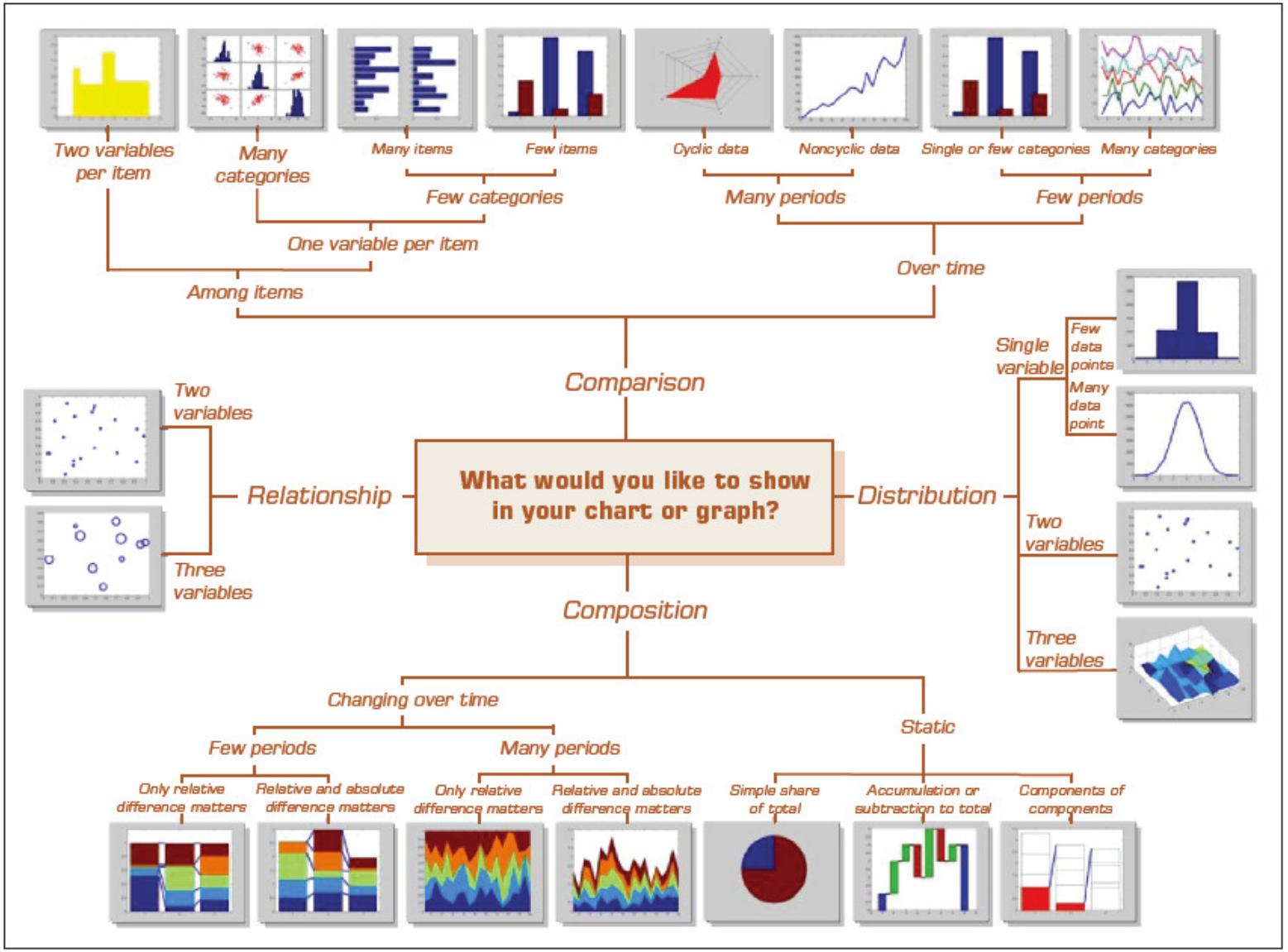
Application Case 2.6

Macfarlan Smith Improves Operational Performance Insight with Tableau Online

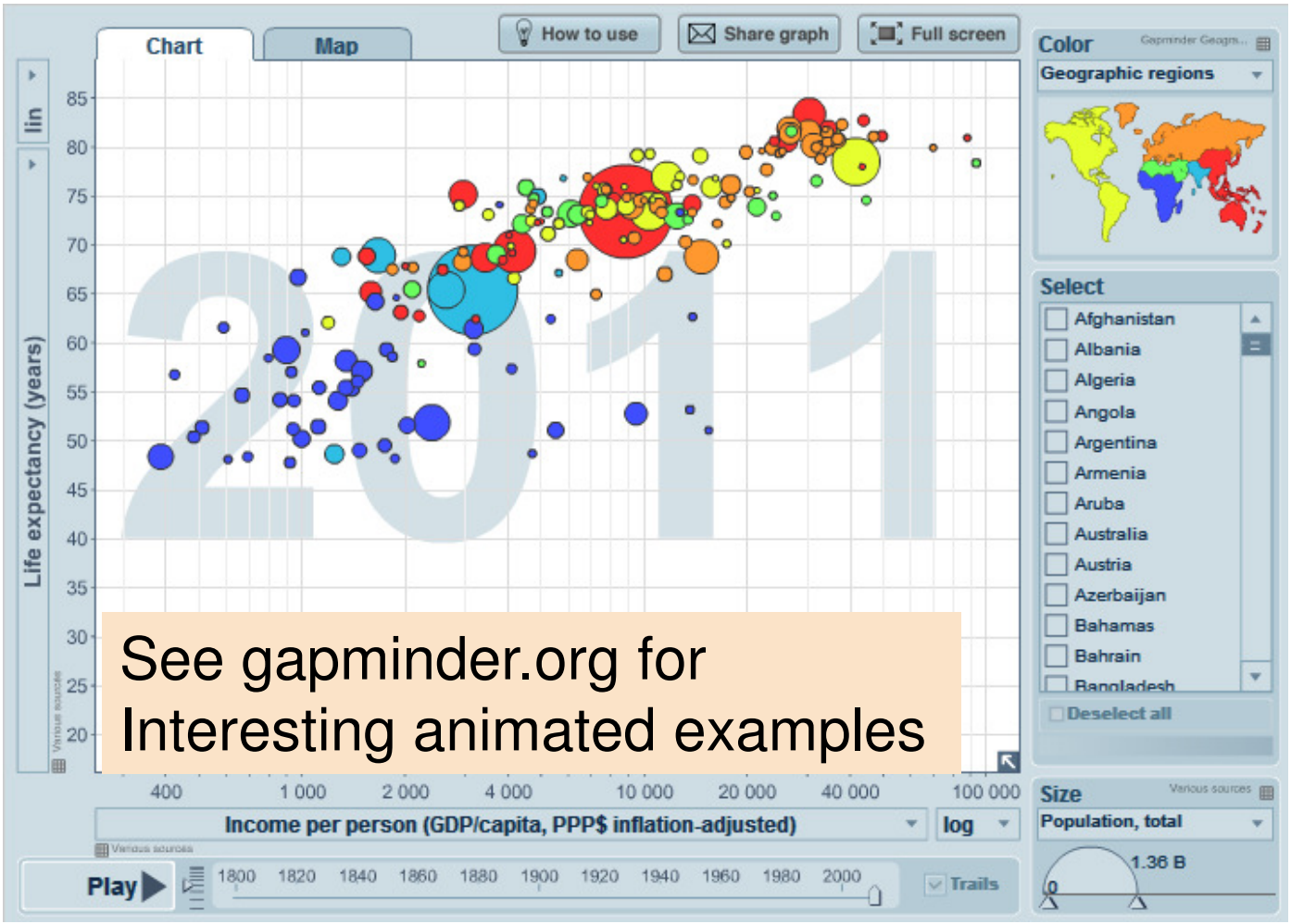
Questions for Discussion

1. What were the data and reporting related challenges Macfarlan Smith facing?
2. What was the solution and the obtained results and/or benefits?

Which Chart or Graph Should You Use?



An Example Gapminder Chart
Wealth and Health of Nations



The Emergence of Data Visualization and Visual Analytics

- Magic Quadrant for Business Intelligence and Analytics Platforms (Source: Gartner.com)
- Many data visualization companies are in the 4th quadrant
- There is a move towards visualization

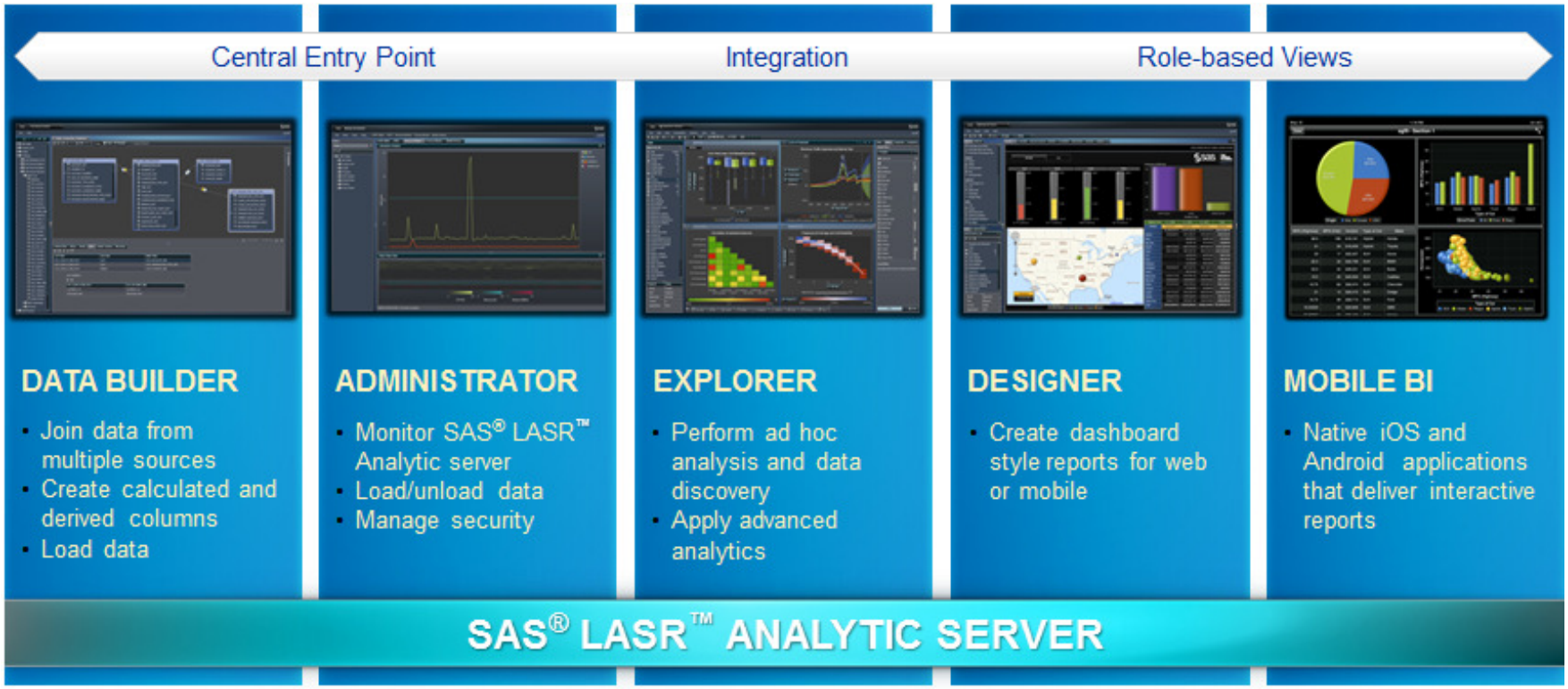
The Emergence of Data Visualization and Visual Analytics

- Emergence of new companies
  - Tableau, Spotfire, QlikView, …
- Increased focus by the big players
  - MicroStrategy improved Visual Insight
  - SAP launched Visual Intelligence
  - SAS launched Visual Analytics
  - Microsoft bolstered PowerPivot with Power View
  - IBM launched Cognos Insight
  - Oracle acquired Endeca

Visual Analytics

- A recently coined term
  - Information visualization + predictive analytics
- Information visualization
  - Descriptive, backward focused
  - “what happened” “what is happening”
- Predictive analytics
  - Predictive, future focused
  - “what will happen” “why will it happen”
- There is a strong move toward visual analytics

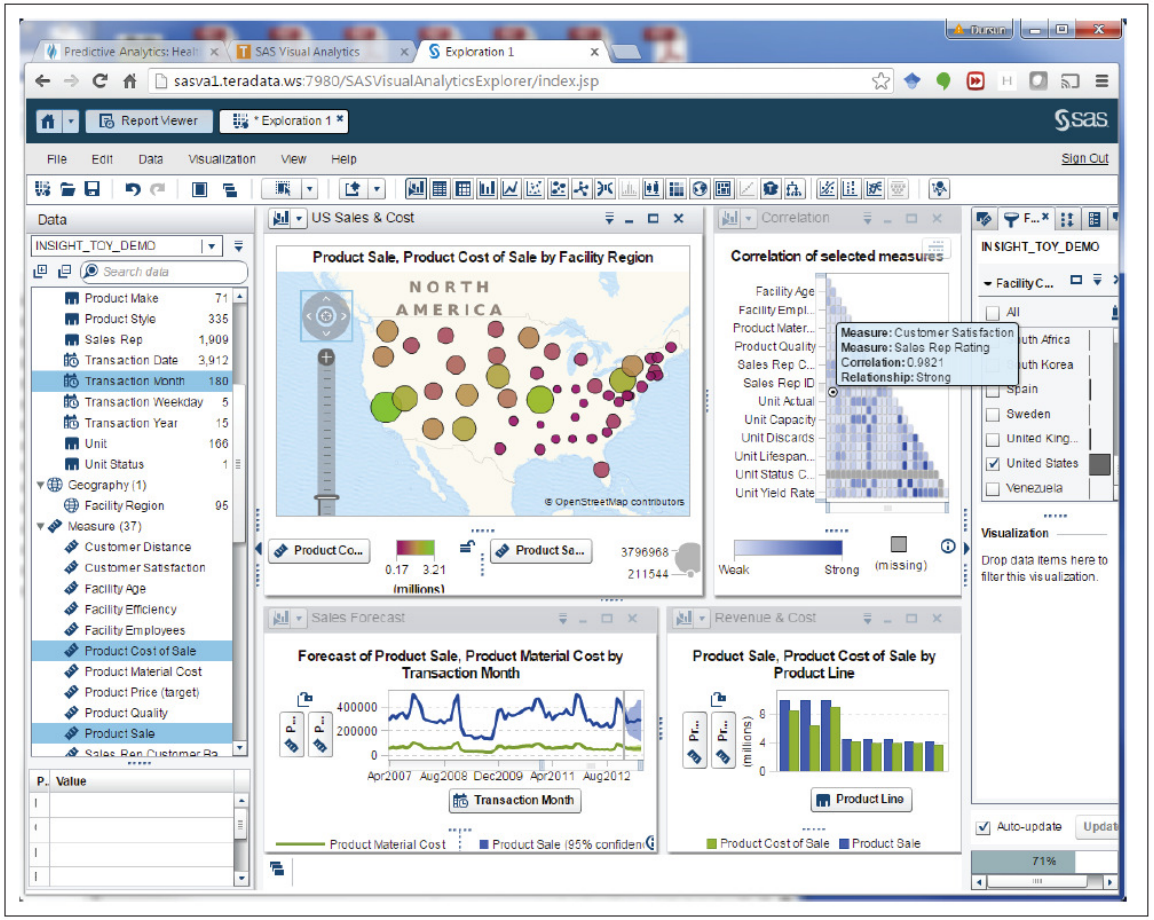
Visual Analytics by SAS Institute



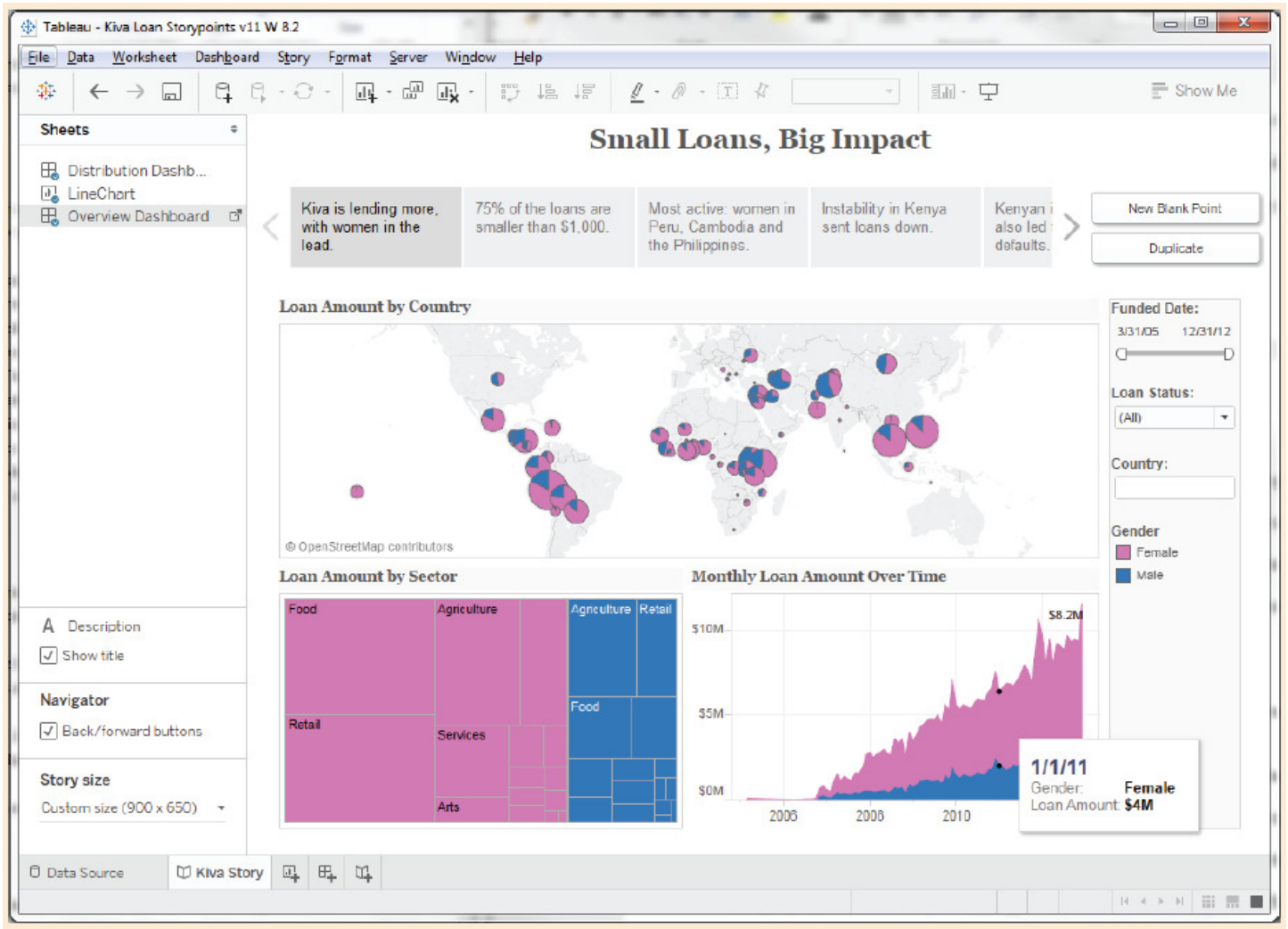
- SAS Visual Analytics Architecture
  - Big data + In memory + Massively parallel processing + ..

Visual Analytics by SAS Institute

- At teradatauniversitynetwork.com, you can learn more about SAS VA, experiment with the tool



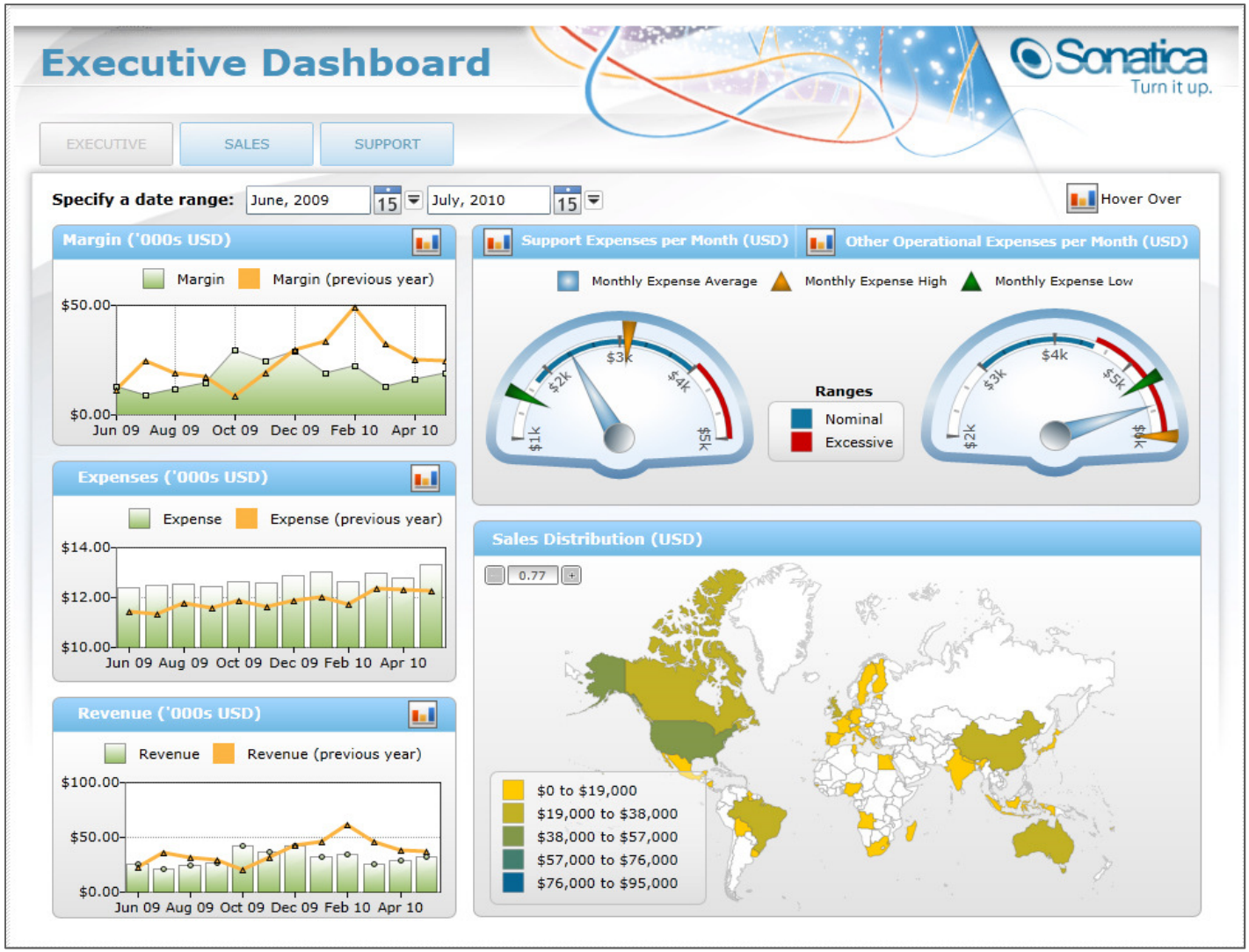
Technology Insight 2.3
Telling Great Stories with Data and Visualization



Performance Dashboards

- Performance dashboards are commonly used in BPM software suites and BI platforms
- Dashboards provide visual displays of important information that is consolidated and arranged on a single screen so that information can be digested at a single glance and easily drilled in and further explored

Performance Dashboards



Application Case 2.7
Dallas Cowboys Score Big with Tableau and Teknion

Questions for Discussion

1. How did the Dallas Cowboys use information visualization?
2. What were the challenge, the proposed solution, and the obtained results?

Performance Dashboards

- Dashboard design
  - The fundamental challenge of dashboard design is to display all the required information on a single screen, clearly and without distraction, in a manner that can be assimilated quickly
- Three layer of information
  - Monitoring
  - Analysis
  - Management

Performance Dashboards

- What to look for in a dashboard
  - Use of visual components to highlight data and exceptions that require action
  - Transparent to the user, meaning that they require minimal training and are extremely easy to use
  - Combine data from a variety of systems into a single, summarized, unified view of the business
  - Enable drill-down or drill-through to underlying data sources or reports
  - Present a dynamic, real-world view with timely data
  - Require little coding to implement, deploy, and maintain

Best Practices in Dashboard Design

- Benchmark KPIs with Industry Standards
- Wrap the Metrics with Contextual Metadata
- Validate the Design by a Usability Specialist
- Prioritize and Rank Alerts and Exceptions
- Enrich Dashboard with Business-User Comments
- Present Information in Three Different Levels
- Pick the Right Visual Constructs
- Provide for Guided Analytics

Application Case 2.8

Visual Analytics Helps Energy Supplier Make Better Connections

Questions for Discussion

1. Why do you think energy supply companies are among the prime users of information visualization tools?
2. How did Electrabel use information visualization for the single version of the truth?
3. What were their challenges, the proposed solution, and the obtained results?