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Practical Tools to Make Data Work for You

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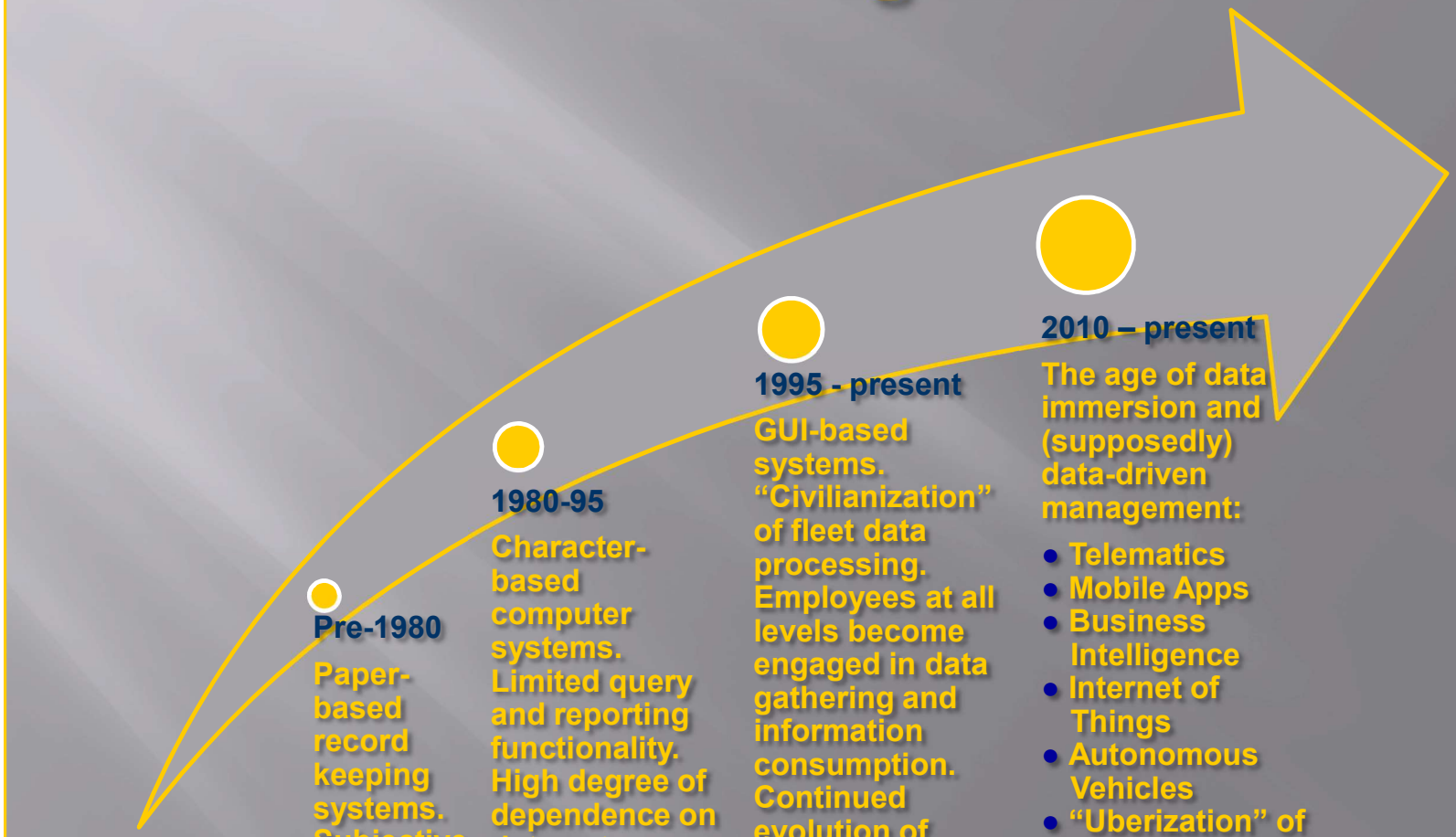
The Evolution of Data Processing in Fleet Management



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Uses of Data in Fleet Management

- Performance measurement
- Decision support
- Development of business intelligence

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Uses of Data in Fleet Management

Performance Measurement:

{Use of} quantifiable indicator{s}… to assess how well an organization or business is achieving its desired objectives. Many business managers routinely review various performance measure types to assess such things as results, production, demand and operating efficiency in order to get a more objective sense of how their business is operating and whether improvement is required.

Source: http://www.businessdictionary.com/definition/performance-measure.html

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Uses of Data in Fleet Management

Decision Support:

{Process} designed to provide assistance in determining and evaluating alternative courses of action. A DS {process} 1) acquires data from the mass of routine transactions of a firm, 2) analyzes it with advanced statistical techniques to extract meaningful information, and 3) narrows down the range of choices by applying rules based on decision theory. Its objective is facilitation of 'what if' analysis and not replacement of a manager's judgment.

Source: http://www.businessdictionary.com/definition/decision-support-system-DSS.html

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Uses of Data in Fleet Management

Business Intelligence:

Computer-based techniques used in spotting, digging-out, and analyzing 'hard' business data… Objectives of a BI exercise include 1) understanding of a firm's internal and external strengths and weaknesses, 2) understanding of the relationship between different data for better decision making, 3) detection of opportunities for innovation, and 4) cost reduction and optimal deployment of resources. See also competitive intelligence.

Source: http://www.businessdictionary.com/definition/business-intelligence-BI.html

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Uses of Data in Fleet Management

Activity-Based Cost (ABC) Analysis:

Cost accounting approach concerned with matching costs with activities… that cause those costs… ABC states that 1) products consume activities, 2) it is the activities (and not the products) that consume resources, 3) activities are the cost drivers, and 4) that activities are not necessarily based on the volume of production. ...ABC {analysis} allocates direct and indirect costs to activities such as processing an order, attending to a customer complaint, or setting up a machine. …it enables management to better understand a) how and where the firm makes a profit, (b) indicates where money is being spent and (c) which areas have the greatest potential for cost reduction.

Source: http://www.businessdictionary.com/definition/activity-based-costing-ABC.html

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Sample Activity-Based Cost Model: A PM, DS, *and* BI Tool

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The Data Analysis Process

- Ask a question
- Identify data sources
- Conduct exploratory data analysis
- Clean the data
- Select appropriate analytical technique(s)
- Conduct analysis
- Challenge your results
- Document your steps and present your work

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Ask a Question

Typical questions that fleet managers try to answer through data are:

- Is my fleet the right size?
- Do I have the right types of vehicles?
- Am I replacing vehicles on time?
- Do I have the right size staff, garage, or parts inventory?
- Am I accurately capturing my costs (i.e., am I competitive with the local market)?

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Data Sources

- Fleet and fuel card transactional data
- Fuel management systems
- Telematics devices
- Motor pool management and key control systems
- Asset records
- Work orders
- Fleet management information systems

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Key Issues with Data Sources

- Each data source can present its own types of inaccuracies:
  - Manual meter entries at the pump
  - Improperly calculated operating rates
  - Lack of segregation between dissimilar costs
- Any time humans are involved in data collection, there is more opportunity for error
- Poor data integrity can skew your results and undercut the story that you are trying tell about your fleet

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Exploratory Data Analysis

- Import the data into a spreadsheet and start calculating basic metrics
  - Cost per mile
  - Annual miles per vehicle
- Normalize Data
  - Identify outliers

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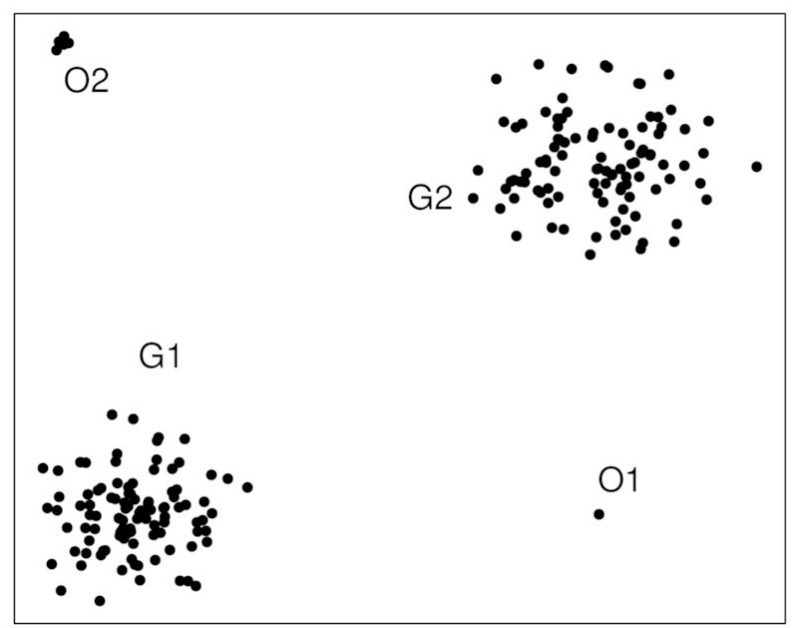
What is an outlier?

Outlier:

Statistical data which is extremely different from the others in the same sample.

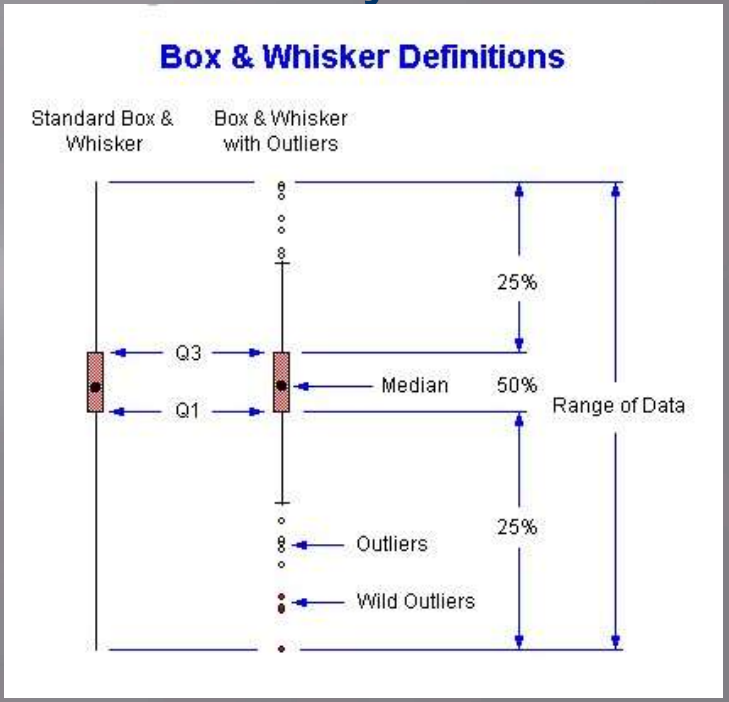
There is no rigid definition of what constitutes an outlier, but there are some simple methods of determination.



Sources: http://www.businessdictionary.com/definition/outlier.html
https://en.wikipedia.org/wiki/Outlier#/media/File:Two-dimensional_Outliers_Example.png

Outlier Identification

- Calculate the "Five Number Summary"
  - Maximum value
  - Third quartile
  - Median value
  - First quartile
  - Minimum value
- Calculate interquartile range and fences



Source: http://mvpprograms.com/help/mvpstats/graphics/WhatAreBoxAndWhiskerPlots

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Sample:
Outlier Identification

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Select the Appropriate Analytical Technique

- Descriptive statistics – like the "Five Number Summary" – are relatively easy to calculate as previously demonstrated
- Some fleet issues – like lifecycle cost analysis – require more sophisticated techniques like regression analysis
  - As experienced fleet managers, we all know that:
    - Vehicles lose the most residual value in the first years
    - Maintenance and repair costs increase as vehicles age
  - Regression analysis can prove it, assuming you have clean data of sufficient sample size to produce results

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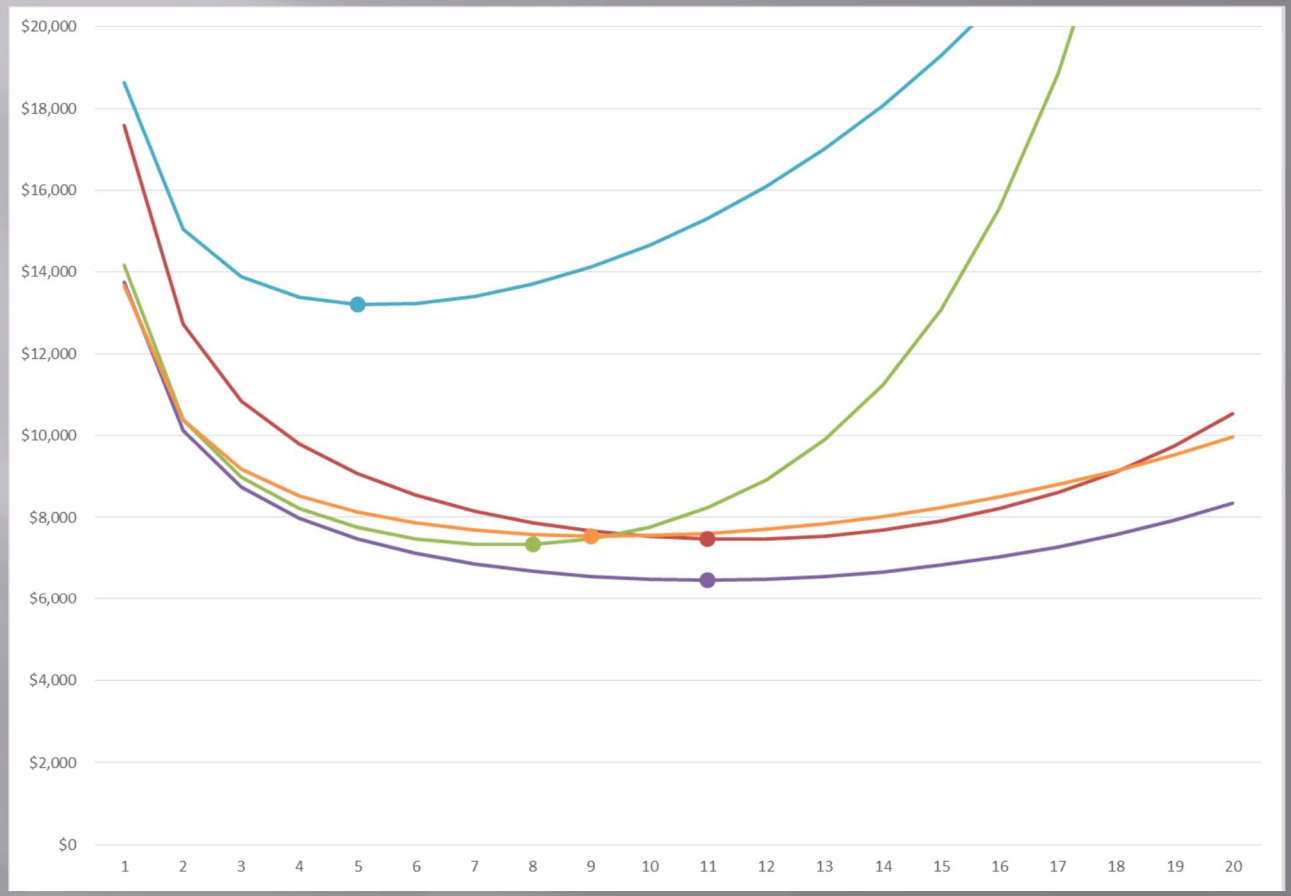
Regression Results with Messy Data and Small Sample Sizes



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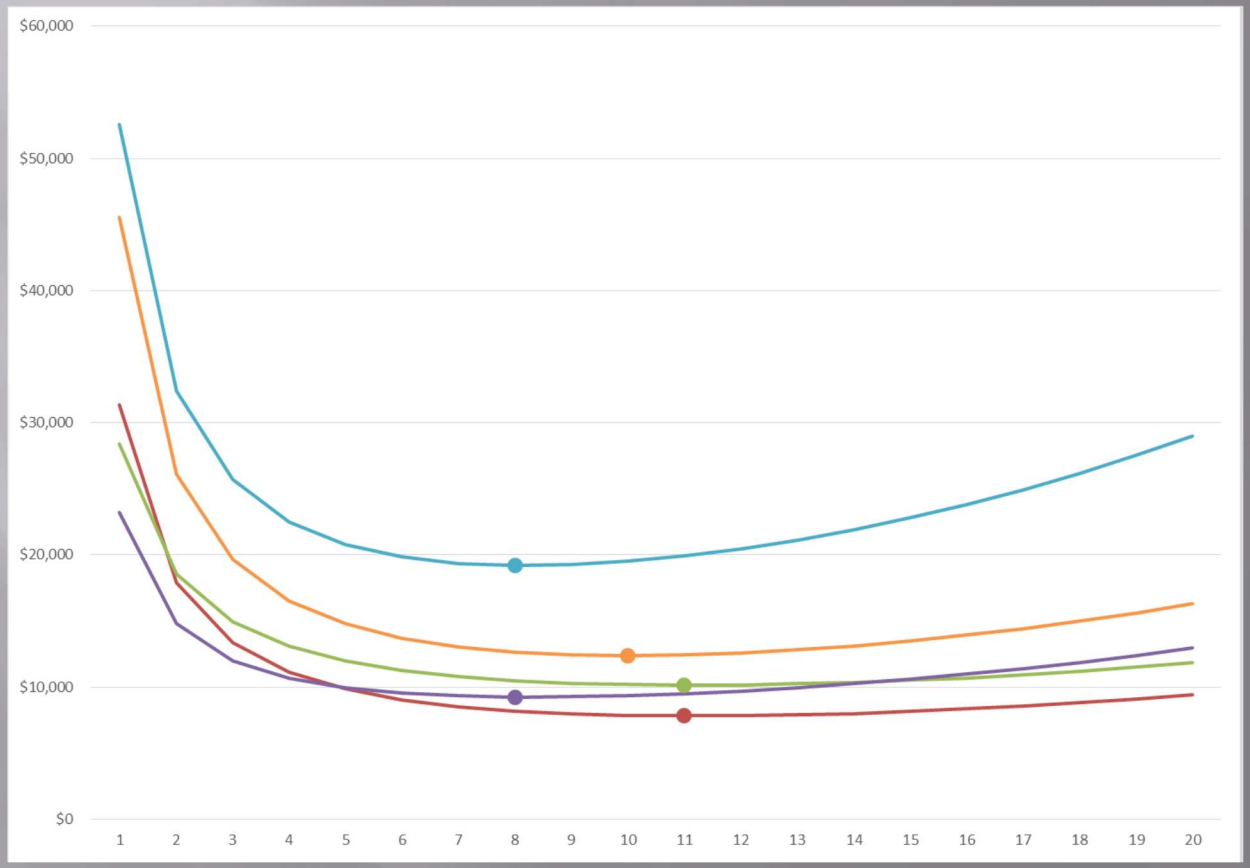
Regression Results with Clean Data and Large Sample Sizes



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Document and Present

- For performance measurement
  - Usually taken as periodic snapshots that are posted for stakeholders to review
  - Add explanations for how measures are calculated
- For decision support
  - Analysis should support an argument for a course of action (e.g., more funding, more resources)
  - Audience should form the impression that all aspects of the issue have been considered
- For business intelligence
  - Identify strengths, weaknesses, priorities

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Key Points to Remember

- Fleet data should not be captured for its own sake but, rather to:
  - Calculate performance measures
  - Support decision-making processes
  - Inform business intelligence
- The accuracy of fleet analysis and the ensuing conclusions about the management of your fleet can be heavily affected by data codification, capture, and verification practices

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Homework

Excel Functions Used in this Presentation

- Filters – sift through data to find outliers
- Reference Locks – drag and fill formulas
- Pivot Tables – easily sum or average large data by vehicle or class
- Five Number Summary – MAX, MEDIAN, MIN, QUARTILE.EXC
- Pull in data from another sheet – INDEX & MATCH or VLOOKUP
- Conditional Logic – IF statements

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