CASE STUDIES FOR DATA ANALYTICS

Webinar 1

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Data Analytics

Definition (Technical)

- Data analysis is a process of inspecting, cleansing, transforming, and modelling data with the goal of discovering useful information, informing conclusions, and supporting decision-making.

Definition (Business PoV)

- Data analytics is the process of exploring and analyzing large datasets to find hidden patterns, unseen trends, discover correlations, and derive valuable insights to make business predictions.

- Any type of information can be subjected to data analytics techniques to get insight that can be used to improve things.

- Data analytics techniques can reveal trends and metrics that would otherwise be lost in the mass of information.

- This information can then be used to optimize processes to increase the overall efficiency of a business or system.

Examples

- Manufacturing companies often record the runtime, downtime, and work queue for various machines and then analyze the data to better plan the workloads so the machines operate closer to peak capacity.

- Content companies use many of the same data analytics to keep you clicking, watching, or re-organizing content to get another view or another click.

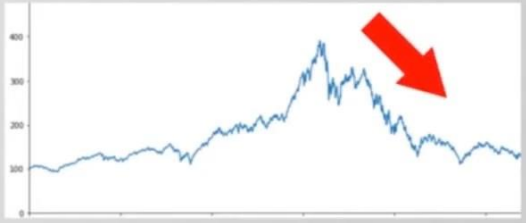
Analysis vs Analytics

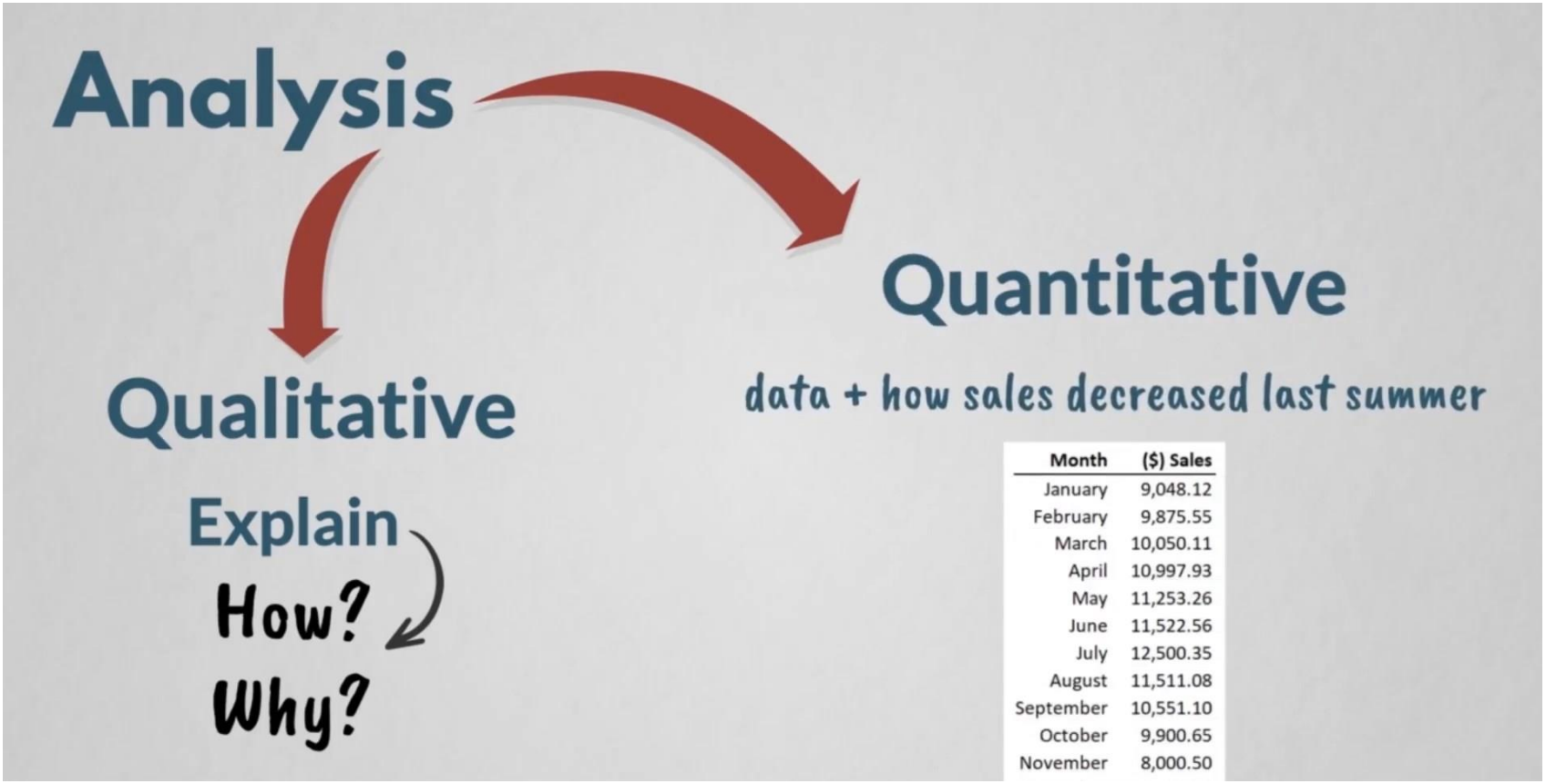
Analysis

Past

Explain

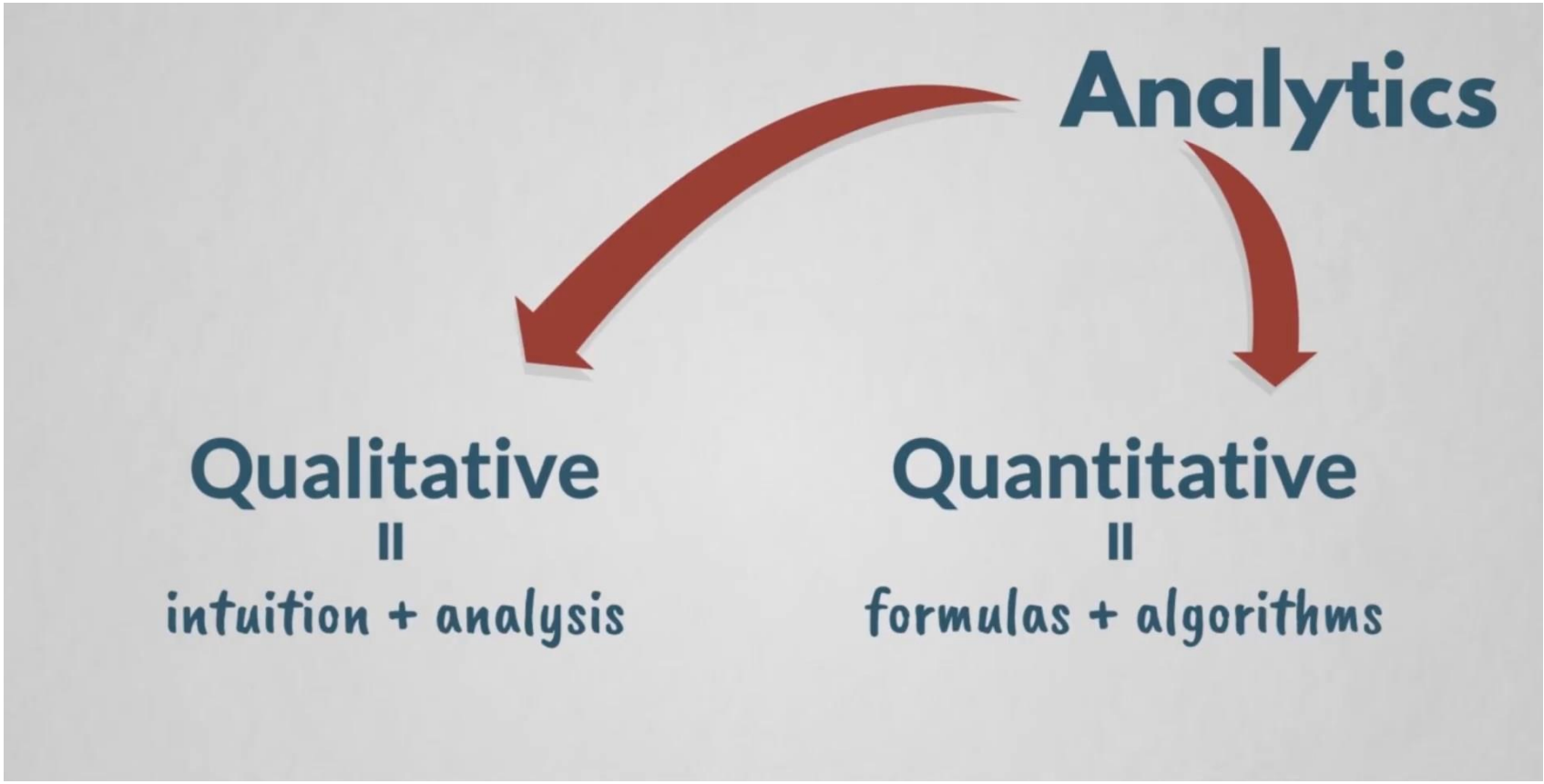
How? Why?





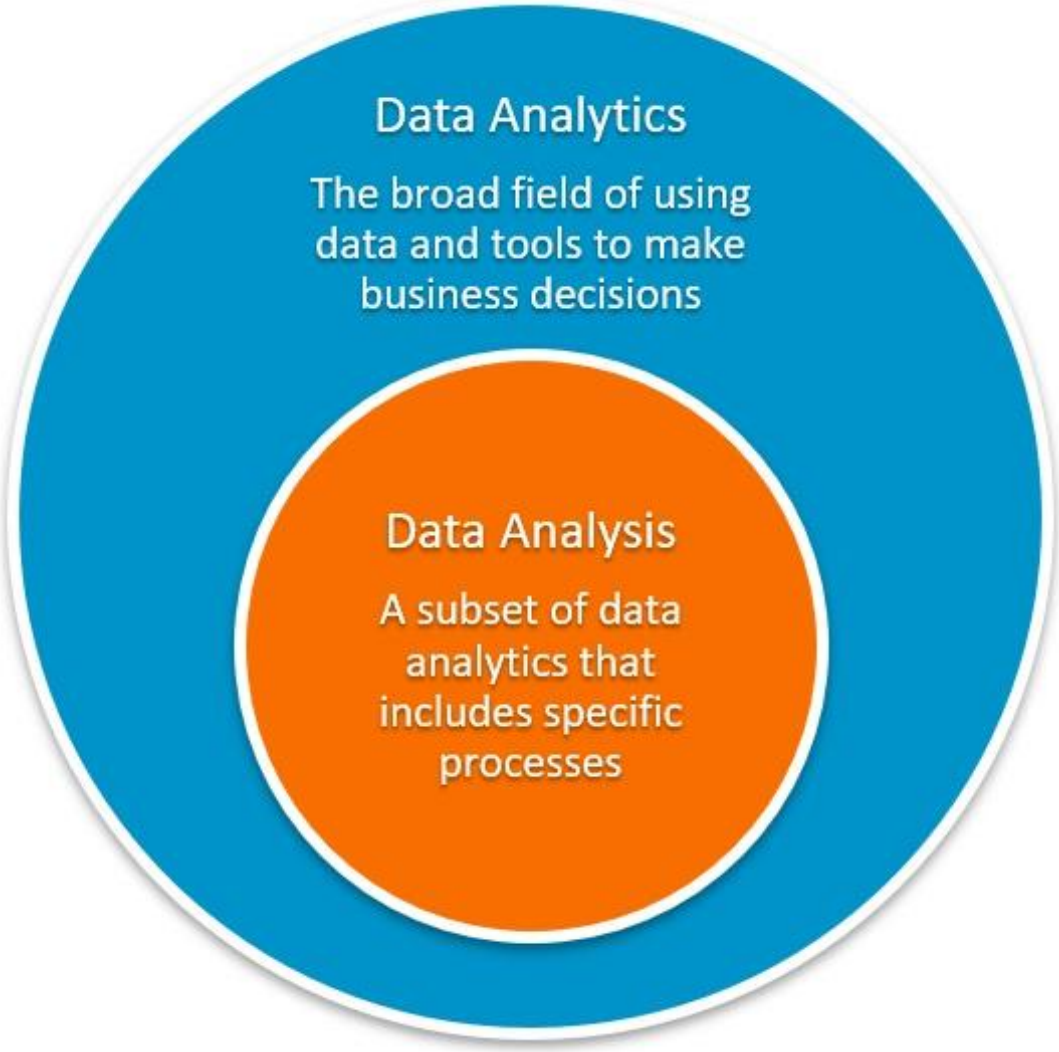
Month	($) Sales
January	9,048.12
February	9,875.55
March	10,050.11
April	10,997.93
May	11,253.26
June	11,522.56
July	12,500.35
August	11,511.08
September	10,551.10
October	9,900.65
November	8,000.50


Analytics
Future
Explore potential future events


Analytics
Qualitative
=
intuition + analysis
Quantitative
=
formulas + algorithms


QUALITATIVE ANALYTICS

Quantitative analytics


Data Analytics
The broad field of using data and tools to make business decisions
Data Analysis
A subset of data analytics that includes specific processes

Analysis vs Analytics

innovate achieve lead

Basis for Comparison	Data Analytics	Data Analysis
Form	It is 'general' form of analytics which is used in businesses to make decisions from the data which are data-driven	It is a specialized form of data analytics used in businesses to analyse data and take some insights of it.
Structure	It consist of data collection and inspect in general and it has one or more users	It includes defining a data, investigation, cleaning, transforming the data to give a meaningful outcome
Tools	The commonly used ones are R, Tableau Public, Python, SAS, Apache Spark, Excel etc.	The commonly used ones are OpenRefine, KNIME, RapidMiner, Google Fusion Tables, Tablaeu Public, NoodeXL, WolframAlpha etc.

Basis for Comparison	Data Analytics	Data Analysis
Sequence	The lifecycle consists of Business Case Evaluation, Data Identification, Data Acquisition & filtering, Data Extraction, Data Validation and cleansing, Data Aggregation & Representation, Data Analysis, Data Visualization, Utilization of Analysis results	The sequence followed are data gathering, data scrubbing, analysis of data and interpret the data precisely so that you can understand what your data want to say.

Basis for Comparison	Data Analytics	Data Analysis
Usage	It can be used to find masked patterns, anonymous correlations, customer preferences, market trends and other necessary information that can help to make wiser decisions.	It can be used in various ways like one can perform analysis like descriptive, exploratory, inferential, predictive analysis etc to find useful insights from the data.
Example	Say you have 1 GB of customer purchase related data of past 1 year, now one has to find out what our customer's next possible purchase is going to be by using data analytics.	Say you have 1 GB of customer purchase related data of past 1 year, you are trying to find what happened so far. (We look into the past)

Types of Data Analytics

Identifying the types of Data Analytics with Fever Example

- You went to bed last night feeling fine, but you woke up at this morning feeling slightly sick, maybe a little body ache and you have some chills. You suspect you might have a fever, so you take your temperature and find that at the few degrees higher than normal. Now maybe you make the decision to go to the doctor to get checked out. Once you are at the doctor, he asks you questions and describe on what happened and how you are feeling at the moment.

- The doctor tries to find out what you might have done out of the ordinary like did you have something cold, were you exposed to rain or cold climate or did you have contact with a sick person or did you have food from outside etc.

- Now they'll probably take your temperature themselves to check it and they might check your heart rate and blood pressure. Now, they move on to trying to figure out what this means based on all your symptoms the doctor diagnoses that you most likely have the flu.

- Now what happens if you don't do anything, many people feel miserable for a few days but then recover just fine from the flu on their own. But maybe there's underlying health problems or other risk factors that make it more likely that you won't recover as easily.

- The doctor talks with you and text your medical records and finds there's nothing that makes you especially vulnerable. So at this point they predict that with rest and some time you'll feel better on your own.

- At this point a prediction has been made and you'll be fine without any additional medical treatment.

- The doctor then sends you home with instructions to rest drink plenty of fluids and to take it over the counter pain reliever if the flu get to be bothersome. At this point you have a prescription.

- You've been prescribed rest fluids and over-the-counter pain reliever if necessary. This is how you optimize the improvement. Will you get better even if you don't do these things most likely but this will help you go faster and for you to feel better as you're getting healthy again.

Types of Data Analytics

The four types of data analytics are:

- Descriptive Analytics
- Diagnostic Analytics
- Predictive Analytics
- Prescriptive Analytics

Descriptive Analytics

- The first type of data analytics is descriptive analytics.
- It is at the foundation of all data insight.
- It is the simplest and most common use of data in business today.
- Descriptive analytics answers the "what happened" by summarizing past data, usually in the form of dashboards.

- The biggest use of descriptive analysis in business is to track Key Performance Indicators (KPIs).
- KPIs describe how a business is performing based on chosen benchmarks.
- Business applications of descriptive analytics include:
  - KPI dashboards
  - Monthly revenue reports
  - Sales leads overview

Diagnostic Analytics

- After asking the main question of “what happened”, the next step is to dive deeper and ask why did it happen?

- Diagnostic analytics takes the insights found from descriptive analytics and drills down to find the causes of those outcomes.

- Organizations make use of this type of analytics as it creates more connections between data and identifies patterns of behavior.

- A critical aspect of diagnostic analytics is creating detailed information.

- When new problems arise, it is possible you have already collected certain data pertaining to the issue. By already having the data at your disposal, it ends having to repeat work and makes all problems interconnected.

- Business applications of diagnostic analytics include:
  - A freight company investigating the cause of slow shipments in a certain region
  - A SaaS company drilling down to determine which marketing activities increased trials

- Both descriptive and diagnostic analytics focus on the past.

- It's all about what happened before the current point in time.

Predictive Analytics

- Predictive analytics attempts to answer the question "what is likely to happen".
- This type of analytics utilizes previous data to make predictions about future outcomes.
- This type of analysis is another step up from the descriptive and diagnostic analyses.
- Predictive analysis uses the data we have summarized to make logical predictions of the outcomes of events.

- This analysis relies on statistical modeling, which requires added technology and manpower to forecast.

- It is also important to understand that forecasting is only an estimate; the accuracy of predictions relies on quality and detailed data.

- Business applications of predictive analysis include:
  - Risk Assessment
  - Sales Forecasting
  - Using customer segmentation to determine which leads have the best chance of converting

Prescriptive Analytics

- Prescriptive analytics helps answer questions about what should be done.
- By using insights from predictive analytics, data-driven decisions can be made.
- This allows businesses to make informed decisions in the face of uncertainty.
- Prescriptive analytics techniques rely on machine learning strategies that can find patterns in large datasets.

- By analyzing past decisions and events, the likelihood of different outcomes can be estimated.

- Currently, most of the big data-driven companies (Apple, Facebook, Netflix, etc.) are utilizing prescriptive analytics and AI to improve decision making.

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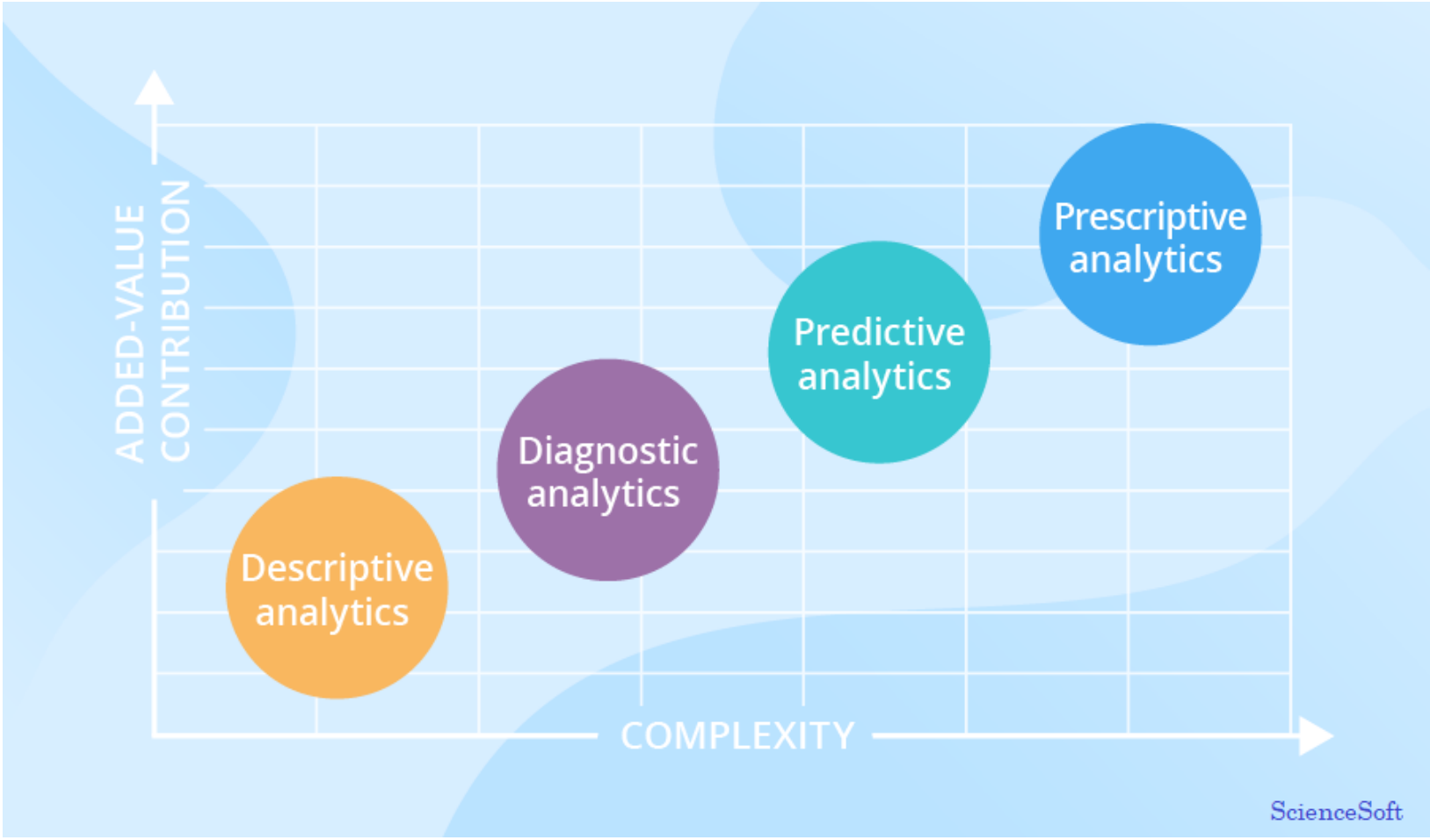
- Make sure you take time if you're predicting to also understand in detail what happened and why it happened.
- That's the only way to really understand what's going to happen going forward.
- The same thing with perspective analytics.
- People often want to jump straight there because they want to make changes or they assume they know what happened

Summary of Types of Data Analytics

- Descriptive, answers the question, "What happened?"
- Diagnostic, answers the question, "Why did this happen?"
- Predictive, answers the question, "What might happen in the future?"
- Prescriptive, answers the question, "What should we do next?"


ADDED-VALUE CONTRIBUTION
COMPLEXITY
Descriptive analytics
Diagnostic analytics
Predictive analytics
Prescriptive analytics
ScienceSoft

Case Studies

- Some links to see some case studies and see for yourself which analytics it comes under.

- https://leaps.analyttica.com/sample_cases
- https://www.tredence.com/case-studies/
- https://www.digitalvidya.com/blog/google-analytics-case-studies/
- https://www.datamensions.com/blog/diagnostic-analytics
- https://online.hbs.edu/blog/post/predictive-analytics
- https://online.hbs.edu/blog/post/prescriptive-analytics

Conclusion

- We have identified the key differences between four types of data analytics
- We have discussed Case Studies on various data analytics.

Thank You