# STQD6134: Business Analytics

Introduction

# Business Analytics

Business may focus on profits and sales, but business analytics (BA) focuses on data. Activities reliant on data require the business analyst to acquire it from diverse sources. The term Extract, Transform, and Load, commonly referred to as ETL, is a deliberate process to get, manipulate, and store data to meet business or analytic needs.

# From 3Vs to 5Vs in data

- Volume: The size of datasets has grown from megabytes to petabytes
- Velocity: The speed of data arrival has changed to near real time
- Variety: The sources of data have grown from structured databases to unstructured ones, such as social media, websites, audio, and video
- Veracity: The inconsistencies and uncertainty in data that can be difficult to control
- Value: Data needs to be converted into something valuable to extrapolate useful information

- Together these three characteristics pose a growing challenge to the business community.
- Data is stored in facilities across a vast network of local servers or relational databases.
- Virtual software access it with cloud-based applications.
- BI applications have typically included static dashboards based on fixed measures using structured data.
- Big data changes the business by affording a competitive advantage to those who can extract value from the large and rapidly changing sources of diverse data.

- Today, people ask business analysts, what is going to happen? To answer this type of question, a business needs tools and processes to tap into the growing stream of data. Often this data will not fit into the existing databases without transformation. The continual need to acquire data requires a structured ETL approach to wrangle the unstructured nature of modern data. Think about how companies may benefit from using the techniques presented, even when they are less complex than big data.

*Types of business analytics:*

*1. Descriptive analytics*

*2. Diagnostic analytics*

*3. Predictive analytics*

*4. Prescriptive analytics*

# Descriptive Analytics

- Descriptive analytics is used to summarize past data and understand what has happened. It involves examining historical data to gain insights into customer behavior, identify trends, and uncover key performance indicators.

- This is the most fundamental and accessible type of business analytics—you can think of this as analyzing a standard dashboard, spreadsheet, or chart. It literally describes the data, like a KPI or the number of sales for a store.

# Diagnostic analytics

- Diagnostic analytics takes descriptive analytics a step further by using data mining techniques to look for patterns and uncover correlations. It can be used to identify the root cause of a problem, discover opportunities, and understand how changes affect other areas of the business.

# Predictive analytics

- Predictive analytics uses data modeling techniques such as machine learning and artificial intelligence to anticipate future events or trends. This type of analytics can be used to forecast future customer behavior, anticipate market trends, and plan for possible scenarios.

# Prescriptive analytics

- Prescriptive analytics takes predictive analytics a step further by suggesting potential actions and outcomes. It helps business users decide which strategies to pursue, how to optimize operations, and which investments to make. Prescriptive analytics can also be used to provide personalized recommendations to customers.

# Important business metrics

- Definition: Quantifiable measure – to track & assess the status of a specific business process

## 1. Conversion Rate

Conversion rate is the number of people, figured as a percentage, who go on to take the action you want them to take. For example, it could be the percentage of website visitors who press the buy button, fill out a survey form, or show up to an invitation-only sales event. This metric helps you determine if your marketing efforts are paying off. In addition, it can provide insight into what is and isn't working with your product, service, or messaging. To figure out your conversion rate, divide the number of completed actions (those who bought) by the number of possible completions (those who visited your site but did not buy).

## 2. Profits and Sales

A company can close a lot of sales but still not turn a profit. It could be that prices are set too low, or that as a business grows, its expenses grow, too, reducing profits. For example, if your company's sales grow from $7,000 to $10,000 a month, you may automatically equate this jump in sales with $3,000 in profits. But until you run the numbers, including any increased expenses related to growth, you won't know how much profit you earned from the increased sales. Remember, the equation to figure your profit is: Profit = Sales – Expenses

## 3. Customer Referrals

When your existing customers refer you to other people, it’s a sure sign you’re doing something right. It’s important to track those referrals to measure customer satisfaction. In addition, the more referral business you get, the less you have to spend on acquiring new customers. Some businesses give referring customers a reward or incentive for every new customer they refer, while others simply thank them. You can keep track of who sends referrals your way by asking new customers how they heard about you.

## 4. Customer Lifetime Value and Customer Acquisition Cost

When you understand your customer lifetime value (CLV), you will gain a clearer picture of how important it is to retain customers, as well as how much money you should invest in acquiring more. For instance, if you run a beauty salon, and charge an average of $100 per monthly visit, and clients stay with you an average of five years, your average CLV is $6,000.

To figure the CLV for your business, use the following equation: (Average sale) x (Number of repeat transactions) x (Retention time for a typical customer) = CLV.

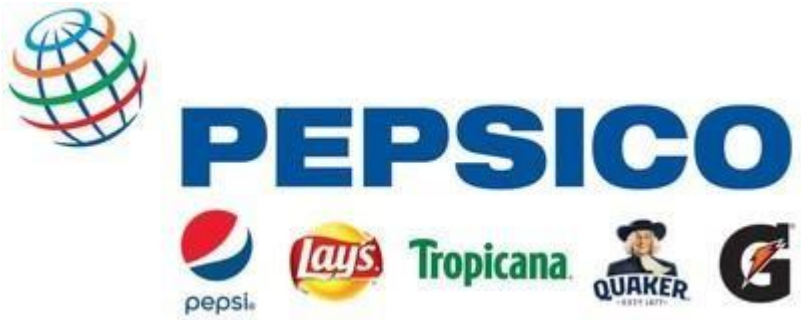
Now that you understand what your customers are worth in dollar terms, you can determine what is reasonable to spend in advertising and marketing to attract new ones. Do this by figuring your Customer Acquisition Cost (CAC), which is how much it costs to get new business. Imagine that the beauty salon owner does a direct mailing campaign to 10,000 local residents for $2,000, and gets a 1 percent response rate. Those 100 people book an appointment, and of those, 50 percent become returning customers. To acquire the 50 new customers, it cost $40 per customer, who will spend an average of $6,000 over the next five years. When running these numbers for your business, you will have to determine what amount is reasonable in acquiring new customers for your business, based on these two metrics.

To figure your CAC, use this equation: (Marketing and advertising expenses) / (Customers) = CAC

## 5. Cash Flow

Without cash, your business can't operate —so it's important to track your cash flow on a regular basis. Positive cash flow occurs when the money coming into your business from sales and accounts receivable is more than what is going out. Negative cash flow occurs when your outgoing expenses exceed the money coming in. To keep a firm grasp on your cash flow, you'll need to run a cash flow analysis weekly, monthly, or quarterly to make sure you have enough coming in to pay what's coming due. If you see that you may be entering a cash flow crunch, take some steps to try to prevent it. You can collect overdue accounts receivable, take out a loan, increase sales, and cut expenses.

# Examples of real life applications of business analytics




- **Supply Chain Efficiency**

PepsiCo is a consumer packaged goods company that relies on huge volumes of data for an efficient supply chain management. The company is committed to ensuring they replenish the retailers' shelves with appropriate volumes and types of products. The company's clients provide reports that include their warehouse inventory and the POS inventory to the company, and this data is used to reconcile and forecast the production and shipment needs. This way, the company ensures retailers have the right products, in the right volumes and at the right time. Listen to this webinar where the company's Customer Supply Chain Analyst talks about the importance of big data analytics in PepsiCo Supply chain.



- **Drive Innovations**

You have probably heard of Amazon Fresh and Whole Foods. This is a perfect example of how big data can help improve innovation and product development. Amazon leverages big data analytics to move into a large market. The data-driven logistics gives Amazon the required expertise to enable creation and achievement of greater value. Focusing on big data analytics, Amazon whole foods is able to understand how customers buy groceries and how suppliers interact with the grocer. This data gives insights whenever there is need to implement further changes.

- **Risk Management**

UOB bank from Singapore is an example of a brand that uses big data to drive risk management. Being a financial institution, there is huge potential for incurring losses if risk management is not well thought of. UOB bank recently tested a risk management system that is based on big data. The big data risk management system enables the bank to reduce the calculation time of the value at risk. Initially, it took about 18 hours, but with the risk management system that uses big data, it only takes a few minutes. Through this initiative, the bank will possibly be able to carry out real-time risk analysis in the near future (Andreas, 2014).


- **Targeted Adverts**

Netflix is a good example of a big brand that uses big data analytics for targeted advertising. With over 100 million subscribers, the company collects huge data, which is the key to achieving the industry status Netflix boosts. If you are a subscriber, you are familiar to how they send you suggestions of the next movie you should watch. Basically, this is done using your past search and watch data. This data is used to give them insights on what interests the subscriber most. See the screenshot below showing how Netflix gathers big data.


- Customer Retention

***How much does the role of data play in Coca-Cola remaining relevant and staying connected to its consumers in the age of digital transformation? What about data and product development?***

*Data plays an increasingly important role in marketing and product development. Consumers do a great job of sharing their opinions with us – either by phone, email or social networks – that allow us to hear their voice and adjust our approach. We often talk about why we have two ears and one mouth – it's better to listen more than we speak. This holds true with our approach on consumer input. Data is also helping us create more relevant content for different audiences. We want to focus on creating advertising content that speaks differently to different audiences. Some people love music. Other people watch every sport no matter what time of year. Our brands are already visible in those spaces, and we're working hard to use data to bring branded content that aligns with people's passions.*

- Coca-Cola Director of Data Strategy

- Exercise:

Work in pair with your friend. Find or think of an example of descriptive, diagnostic, predictive and prescriptive analytics applied to a business scenario. Prepare and share your discussion with the class.