

## **CHAPTER 7** Marketing Analytics

### A LOOK BACK:

Chapter 6 discusses why data visualization is important to organizations. Several different types of charts were presented that can be used in visualizations. We also discussed how dashboards can be used to present multiple visualizations as well as some tools that can be used to generate informative data visualizations.

### A LOOK AT THIS CHAPTER:

Chapters 7 through 10 describe how companies can use data analytics to gain actionable business intelligence (BI) across the four main business functions: marketing, operations, accounting, and finance. These chapters focus on the first four analytic types: descriptive, diagnostic, predictive, and prescriptive. In this chapter, we investigate how data analytics can be used in the marketing function by applying the SOAR model. We begin by introducing the role of marketing in business, the components of the marketing mix, and the questions that might arise in each component of the marketing mix. Next, we investigate marketing data sources as well as how descriptive, diagnostic, predictive, and prescriptive analytics can be used to answer marketing questions. Finally, we introduce the respective tools and techniques that can be used in each type of analytics.

### A LOOK AHEAD:

Chapter 8 applies the SOAR model to operations analytics, including human resources (HR), information technology operations, and supply chain analytics. We then work through the SOAR model through a discussion of examples of operation questions addressable using data

analytics, the sources of operations data as well as the key types of analytics employed. We conclude by demonstrating how the results of operations analytics are reported.

**{VIGNETTE}**

“Everyone has their Lego story”

- Lucy Handley

Founded in 1934 in a small Danish village, Lego (which means play well in Danish) has become the world’s most valuable toy company, larger than Fisher-Price, Barbie, Nerf, and Hasbro. The company started with one design, a 2X4 brick, but now manufactures over 3,700 different types of pieces, allowing seemingly unlimitless building options. In 2015, Lego was named the world’s most powerful **brand**, which is a phrase, symbol, logo, design or word that uniquely identifies a company-just like the distinctive Lego bricks below.



**[[Insert Exhibit 7.1 here]]**

Exhibit 7.1: Lego Blocks

So, how did the Lego become so successful? In addition to have a great product, the company also has great marketing. For example, the Lego Ideas (online) Community allows Lego customers<sup>1</sup> (ok really fans) and builders from around the globe to “imagine, iterate, and evaluate ideas” for new Lego kits. If your idea receives 10,000 support votes in a single calendar year, it will be reviewed by the LEGO Review Board; and if your design is accepted by the Board, it will become a real Lego set – and you will receive a 1% royalty on all sales and licensing revenue.

<sup>1</sup> Technically, consumers use or consume products, but don’t necessarily buy them. Customers buy products, but don’t necessary use or consume them. For example, if a restaurant buys coffee beans, the restaurant is the customer, but not the consumer. The consumer would be the person who buys the cup of coffee from the restaurant. For simplicity purposes, we use the word customer throughout the chapter.

Lego Ideas is brilliant marketing built around creating not just a brand, but a *brand community*. It not only creates a continuing buzz about Lego products, but also creates free product promotion as ideas are shared by community members in social media. It encourages innovation—a key to the company’s mission, which is to inspire and develop the builders of tomorrow. “This community doesn’t just keep brand excitement fresh — it also offers the company a treasure trove of accessible market data,” which Lego can use to better understand their (potential) customers, improving Lego products and sales.

What is your LEGO story?

Sources: Handley, Lucy. “How Marketing Built Lego into the World’s Favorite Toy Brand,” 2018, , CNBC TV Marketing.Media.Money, <https://www.cnbc.com/2018/04/27/lego-marketing-strategy-made-it-world-favorite-toy-brand.html>, accessed 05/12/2020. “How LEGO, Sephora, and The American Red Cross are Using Empathy to Drive their Brand Communities,” Jaime Netzer, 2018, <https://khoros.com/blog/how-lego-sephora-and-american-red-cross-are-using-empathy-drive-their-brand>, accessed 05/12/2020.

Picture is from: <https://www.mentalfloss.com/article/92127/how-many-combinations-are-possible-using-6-lego-bricks>

After reading this chapter, you should be able to:

- LO7-1: Explain the role of marketing and the components of the marketing mix, including product, price, place, and promotion.
- LO7-2: Describe representative marketing questions addressable by data analytics, by marketing mix component.
- LO7-3: Enumerate potential internal and external sources of marketing data.
- LO7-4: Describe and provide examples of descriptive analytics used to answer marketing questions.
  - Lab 7-1 Marketing Descriptive Analytics (Excel)
  - Lab 7-2 Pivot Tables (Excel)
  - Lab 7-3 Histogram (Tableau)
- LO7-5: Describe and provide examples of diagnostic analytics used to answer marketing questions.
  - Lab 7-4 Funnel Chart of Website Data (Excel)
- LO7-6: Describe and provide examples of predictive analytics used to answer marketing questions.
  - Lab 7-5 Regression of Advertising Expense and Sales Revenue (Excel)
  - Lab 7-6 Trend Line of Advertising Expense and Sales Revenue (Tableau)
- LO7-7: Describe and provide examples of prescriptive analytics used to answer marketing questions.
  - Lab 7-7 Cash Flow Analysis of Advertising Campaigns (Excel)
- LO7-8: Characterize how marketing analytics reports results.

(Comp: please insert in the margin: “LO7-1: Explain the role of marketing and the components of the marketing mix, including product, price, place, and promotion”)

## (LEVEL 1 HEADER) THE ROLE OF MARKETING IN BUSINESS

"Your most unhappy customers are your greatest source of learning."

Bill Gates (1999)

Source: *Business @ the Speed of Thought* (1999)

Marketing helps companies meet needs profitably.

Formally, "**marketing** is the activity, set of institutions, and processes for creating, communicating, delivering, and exchanging offerings that have value for customers, clients, partners, and society at large."<sup>2</sup> So, marketing encompasses many processes including: (1) developing a product or service; (2) making potential customers not only *aware* of the product/service, but also *want* the product/service; and (3) selling the product/service to customers.

How do managers use marketing? As demonstrated in the opening vignette, Lego uses customer ideas to create new products. Nike advertises with their iconic slogan "Just Do It" – which creates product awareness by inspiring customers to push themselves beyond their limits – all by wearing their newly purchased Nike gear. Frito-Lay used customer feedback to understand why sales were declining and discontinued the world's first 100 percent compostable SunChips bag, which decomposes in 14 weeks in an active compost pile, after receiving a record number of consumer complaints that the bag was too loud (95 decibels to be exact, which is equivalent to the noise made by a motorcycle engine). Carvana transformed the used car buying experience allowing customers to use the Internet to shop, finance, and trade-

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<sup>2</sup> Source: American Marketing Association. 2017. Available on-line at: <https://www.ama.org/the-definition-of-marketing-what-is-marketing/>, accessed 05/12/2020.

in cars as well as delivering cars to a customer's house or allowing customers to pick up the car from a 24 hour car vending machine.

In summary, marketing is essential to the success of a business. Without marketing, many companies would simply fail due to a lack of sales.

## (LEVEL 2 HEADER) THE MARKETING MIX

The **marketing mix** describes the key choices that a company makes to bring a product/service to market. It consists of Product, Price, Place, and Promotion (i.e., the 4Ps). The 4Ps are intricately intertwined as described below.

**Product** refers to the good or service that a company offers to customers. To be successful, a product must fulfill some customer demand by incorporating features that customers think they need to have. When developing a product, the company needs to plan ahead for the different phases of the **product life cycle**, or the four phases (introduction, growth, maturity, and decline) that products go through from development to decline/market removal. Each phase has its own price, promotion, and place strategies. In addition, the product features may change over the life cycle. The type of product also affects the other three Ps (Price, Place, and Promotion).

**Price** is the amount that a customer pays for a particular product. Setting a price requires looking at the real costs to produce and distribute the product, prices of similar (substitute) items (if any), and the perceived value of a product. If the product is priced higher than the perceived value, customers won't buy it. However, sometimes companies use higher prices to make a product seem like a luxury item, thereby increasing the perceived value to (at least

some) customers. Price can affect the Place where the product is sold and how the product is Promoted.

**Place** identifies where a company sells a product (e.g., brick and mortar, online, company owned stores) and how the product will be delivered. So, distribution is a key component of Place. A product should be generally sold in the place(s) easiest for the target customer to shop. Place can affect what Promotions are used for a Product.

**Promotion** refers to all of the marketing communication strategies and techniques used to convince customers that they need the product at the specified price. It includes advertising, public relations, sales promotions, special offers, and social media.

More recently, additional Ps have been added to the list to create an extended marketing mix:

- (1) Planning, which is the alignment between the corporate and marketing strategy
- (2) Process, which refers to the flow of activities that take place when the business interacts with a customer
- (3) People, which refers to having the proper employees (e.g., resource levels, skills sets, leadership).
- (4) Physical Evidence, which is the physical environment in which the product is delivered (fast food restaurant versus a five star restaurant) and any tangible items that may help performance or communication (e.g., pamphlet, user manual).

For the purposes of this chapter, we will focus on the traditional, or core, Ps: product, price, place, and promotion. Let's look at how the 4 Ps work for Lego. Lego's main *product* is toy bricks (mostly sold in sets now) designed for middle-class and upper-class families. Intricate Lego toys can be costly to produce and the company charges a slight premium for its products. However, the company does not want to set the *price* too high, because it wants middle-class

families to be able to buy Lego sets. With respect to *place*, Lego has production units in the UK, US, Singapore, China, and Czech Republic. Lego has 570 retail stores worldwide. Lego products are also available at department stores, toy stores, movie theaters, amusement parks, big box stores, and even online at Amazon. With respect to *promotion*, Lego is a marketing genius. The company went from basic brick to themed brick sets. Lego also developed additional product lines (e.g., seven amusement parks, movies, books, video/board games, clothes, and interactive online content like Lego Ideas) that have all been carefully designed to promote the buying of its bricks.<sup>3</sup>

With just six, eight-stud LEGO bricks, there are 915,103,765 possible combinations to build.

Soren Eilers, *A LEGO Brickumentary* (2015)

Just think what you could do with more than six bricks. Creative customers have designed intricate My Own Creations (MOCs) like the amazing MOC below:

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<sup>3</sup> Sources. mbasKool.com. 2020. Lego Marketing Mix (4Ps) Strategy. Available on-line at: <https://www.mbasKool.com/marketing-mix/services/17780-legoland.html>, accessed 05/13/2020. Marketing91. 2020. Marketing Mix Of Lego- Lego Marketing Mix. Available on-line at: <https://www.marketing91.com/marketing-mix-lego/>, accessed 05/13/2020.



[[Insert Exhibit 7.2 here]]

Exhibit 7.2 One Example of a Lego Build

Picture Source: <http://prod.static9.net.au/fs/94a53b9d-38bf-4390-8bde-5e9edfe0960a>

(Comp: please insert in the margin: “LO7-2: Describe representative marketing questions addressable by data analytics, by marketing mix component.”)

#### **(LEVEL 1 HEADER) SPECIFYING THE MARKETING QUESTION**

Exhibit 7.3 provides a few basic examples of detailed marketing questions that can be asked by analytics type (e.g., descriptive, diagnostic, predictive, and prescriptive) as well as by the four main components of the marketing mix.

Data Analytics Type	Marketing Mix Component			
	Product	Price	Place	Promotion

<b>Descriptive:</b> What happened? What is happening?	How many units were sold in the period? What was the average sales revenue from a product for each month? What are the top 10 products in terms of sales and profit?	What was the average price of the product each month? What was the average profit margin for the product? What is the average price of similar products in the industry?	How many units were sold in each region? How many units were sold in each store? How many units were sold online?	How many web page views resulted in a sale? How did sales change during a sales promotion? What were sales after a new commercial aired?
<b>Diagnostic:</b> Why did it happen? What are the reasons for the past results?	Why did sales volume change from last period? Why did total sales revenue change from last period?	How and why did units sold change when we lowered the price of a product? How did product sales change when a competitor lowered prices?	Why did sales decrease in one region but increase in another region? Does weather differentially affect regional sales?	Why did web page views change? How did a sales promotion or advertisement affect the purchasing behavior of different types of customers?
<b>Predictive:</b> What will happen in the future? What is the probability something will happen? Is it forecastable?	What products will customers buy together in the future? What will be unit sales in the different phases of the product life cycle?	What is the estimated unit sales and total sales revenue for a price change?	What will be unit sales based on season and location? What will be units sales based on marketing channel?	After brand repositioning, what results should be expected? How will a promotion affect each marketing channel?
<b>Prescriptive:</b> What should we do based on what we expect will happen? How do we optimize our performance based on potential constraints?	What features of the product should be changed to maximize sales revenue? Which products should be discontinued?	What is the optimal price to charge for a product if we wanted to increase volume? What is the optimal price to charge for a product if we wanted to increase total sales revenue?	What is the optimal product assortment at each store? Which marketing channel should carry/not carry products?	How should we best target promotions? What steps/promotions should be taken to increase repeat purchase? How can we optimize advertisements across marketing channels?

[[Insert Exhibit 7.3 here]]

### Exhibit 7.3 Examples of Marketing Questions by Data Analytics Type and Marketing Mix Component

Once the question is determined, companies can then use **marketing analytics**, which are “the processes and technologies that enable marketers to evaluate the success of their marketing initiatives.”<sup>4</sup> Marketing analytics considers the results from all marketing channels during a period of time to hopefully generate a complete understanding of the impact of marketing efforts, and therefore focuses on bringing together the right product and making it available to the right person at the right time in the right place. **Marketing channels** are final product distribution points, like wholesalers or retail stores (online and physical).

#### Progress Check:

1. What are the four components of the marketing mix? What does each represent?
2. How are the components of the marketing mix related?
3. Give an example of a marketing question associated with predictive analytics.

(Comp: please insert in the margin: “LO7-3: Enumerate potential internal and external sources of marketing data.”)

#### **(LEVEL 1 HEADER) OWN THE DATA: WHAT MARKETING DATA IS AVAILABLE? A DISCUSSION OF MARKETING DATA SOURCES**

“While creativity is a significant component of a marketer’s profession, the skill of utilizing data is just as important. Data gives you insight into your audience.”

Channell Alexander (2018)

Source Alexander, Channell. 2018. 5 Must Have Data Sources to Improve Your Marketing Team’s Efficiencies. <https://resources.datanyze.com/blog/5-must-have-data-sources-to-improve-your-marketing-team-s-efficiencies>, accessed 05/19/2020

<sup>4</sup> Source: SAS. 2020. Marketing Analytics: What it is and why it matters. Available on-line at: [https://www.sas.com/en\\_us/insights/marketing/marketing-analytics.html](https://www.sas.com/en_us/insights/marketing/marketing-analytics.html), accessed 05/12/2020

There certainly is a lot of data available that can help address marketing questions. This section details possible sources of marketing data. We start this discussion by learning what internal marketing data is available to use to answer marketing questions.

### **(LEVEL 2 HEADER) INTERNAL MARKETING DATA**

Companies have vast amounts of internally stored data that can be used for marketing analytics. The traditional source of data for a company is the **enterprise resource planning (ERP) system**, which is commonly called the enterprise system (ES) today.<sup>5</sup> The ERP/ES stores all sales transaction data (think sales and cash received; purchases and cash paid) as well as pricing data. The transaction data includes the customer, the amount and date of the transaction as well as the cost of the product sold. So, the ES contains total sales and total cost information for a particular product, as well as the total dollars spent on advertising, promotions, and other marketing campaigns.

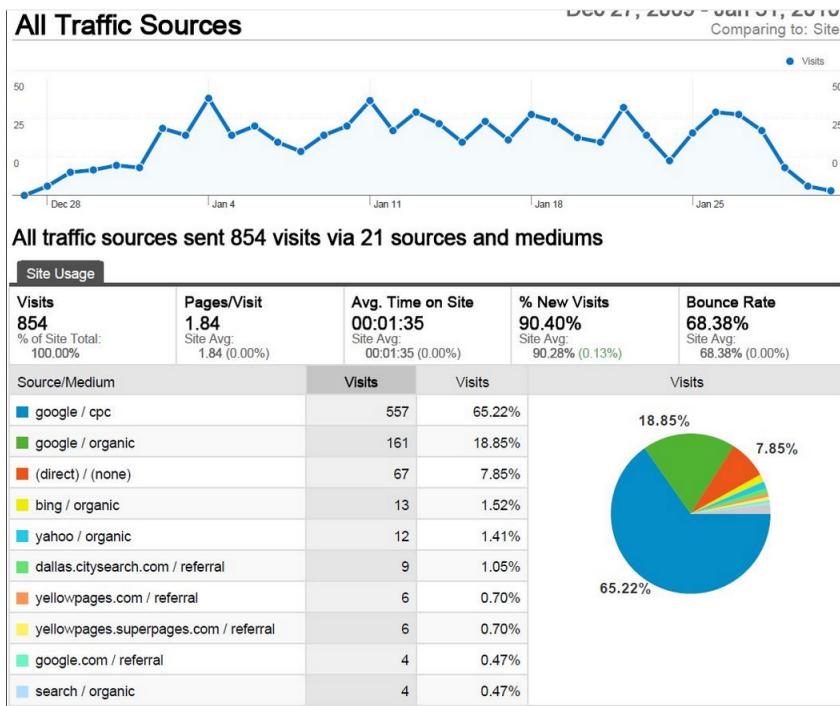
Some companies also use a **customer relationship management (CRM) system**, which can be part of the ES or a standalone system. A CRM system manages the company's interactions with existing and potential customers. It stores contact information, records sales and service issues, helps manage marketing campaigns to identify potential sales opportunities, and manages/records communications with customers across marketing channels. By storing customer data in one shareable location, it makes it easier for companies to increase sales by identifying cross-selling and upselling opportunities; improving service experiences as they can

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<sup>5</sup> Some companies use large ESs like SAP or Oracle. Smaller companies tend to use something more like QuickBooks or Peachtree. We consider all of them to be ES. So, basically whatever system the company uses to record its transactions would count.

be tailored to customer preferences; and personalizing promotions. For example, the results of analytics using CRM data can assist the company in sending personalized emails to customers; track if the emails were opened; track customer actions (e.g., link clicks, purchases); and even predict what time of day a specific customer is more likely to open an email.

Company websites also provide a wealth of information especially when combined with **web analytics**, which extracts and categorizes website quantitative and qualitative data to identify and analyze patterns and trends. Web analytics analyzes website traffic (i.e., the number of visits a company's website gets over a specific period time), page views related to products, links clicked, return visits, and user/customer comments. Web analytics can also monitor potential traffic sources (i.e., which sites led a potential customer to the company's website), such as search engines, other website links, email campaigns, and links from social media, helping companies adjust their marketing strategy. For example, if search engine traffic is low, the company needs to engage in search engine optimization (SEO) by selecting popular keywords, terms, and phrases that direct search engines to the company's website. To begin using web analytics, Google Analytics is a good place to start. (It is free and can be used for any website.) Exhibit 7.4 shows one of the many reports that can be generated in Google Analytics.



[[Insert Exhibit 7.4 here]]

#### Exhibit 7.4 Examples of Google Analytics

Source: Clubb, Molly. 2014. Success Stories from Spring Sales: Keeping Your Momentum Going. Available on-line at: <https://www.hiredhandsoftware.com/resources/blog/hired-hand/2014/05/27/success-stories-from-spring-sales-keeping-your-momentum-going>, accessed 05/15/2020

#### (LEVEL 2 HEADER) EXTERNAL MARKETING DATA

"We need to stop interrupting what people are interested in and be what people are interested in."

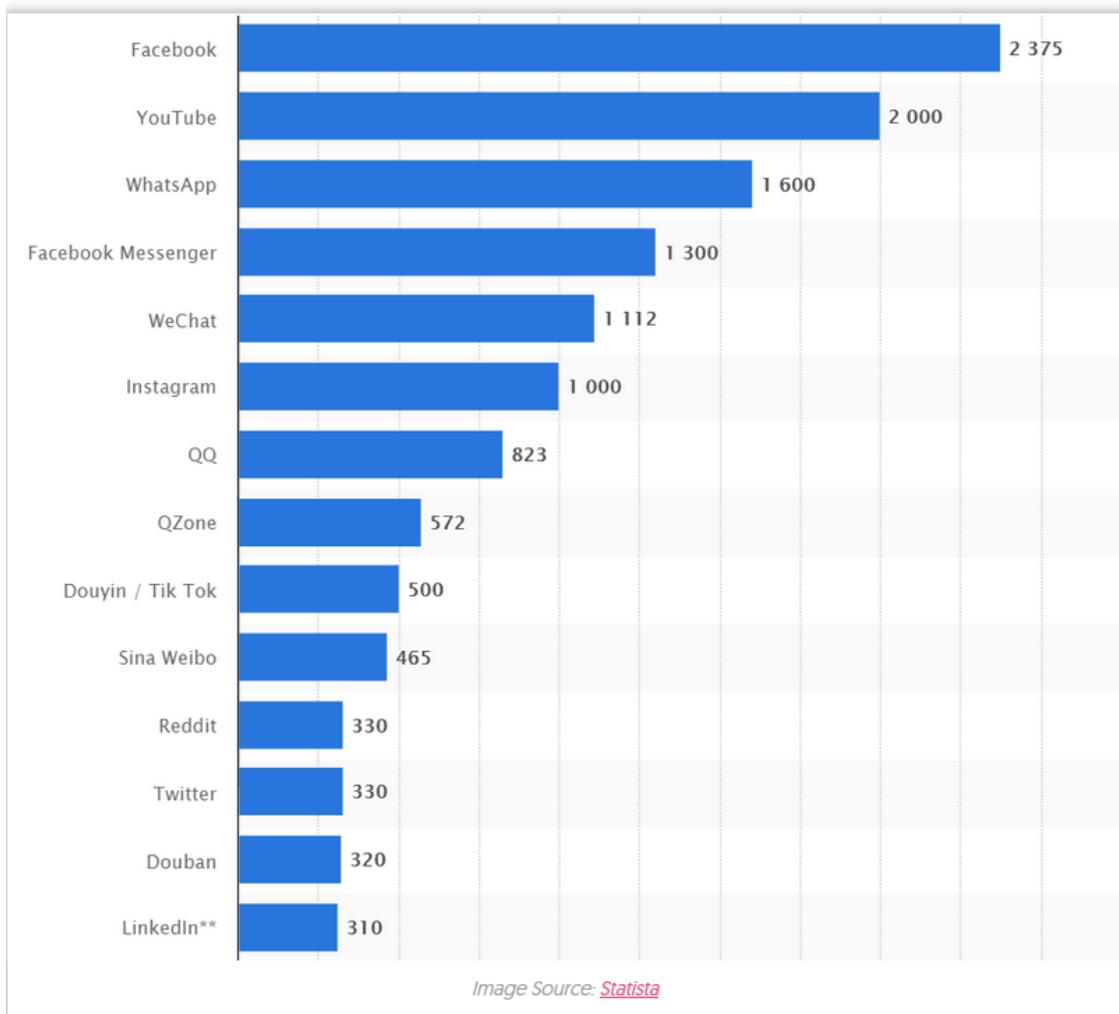
Craig Davis, former chief creative officer at J Walter Thompson (2016)

Source: <https://collectivecontent.co.uk/2016/09/27/craig-davis-on-interruption-marketing/>

In addition to internal marketing data, there are vast amounts of external marketing data

available for companies to use in their marketing analytics. Let's start with social media. 2.4 billion people interact with social media (i.e., Facebook, Instagram, WhatsApp, Tik-Toc,

WeChat, Twitter, or iMessage) each day.<sup>6</sup> Each day 330 million Twitter users send 500 million tweets.<sup>7</sup> Exhibit 7.5 identifies the top social media sites based on the number of users.



[[Insert Exhibit 7.5 here]]

#### Exhibit 7.5 Most Widely Used Social Media Websites

Source: Influencer Marketing Hub. 2020. Social Media Trends for 2020 and Beyond. Available on-line at: <https://influencermarketinghub.com/social-media-trends/>, accessed on 05/18/2020.

<sup>6</sup> Source: Facebook. 2020. The Top 20 Valuable Facebook Statistics. Available on-line at: <https://zephoria.com/top-15-valuable-facebook-statistics/>, accessed on 05/18/2020.

<sup>7</sup> Source. Omnicoreagency. 2020. Twitter by the Numbers: Stats, Demographics, & Fun Facts. Available on-line at: <https://www.omnicoreagency.com/twitter-statistics/>, accessed on 05/08/2020.

Users engage with social media to connect with friends, meet new people, stay current with news, express an opinion, find a job, network, share videos and other content, and help identify products to buy, among other activities. Think of all the information available online through social media websites. For example, Facebook requires a name, birthday, and gender just to sign up – and that is before you add friends, photos, posts about your life, and likes/dislikes. In addition to using social media to advertise for products, companies can use **social media analytics** (SMA) to harvest and analyze user data to help make better informed marketing decisions. SMA allows companies to see what customers are saying about the companies' products as well as competitor products; track keywords and hashtags; and analyze followers, activity, likes, and dislikes. SMA helps companies build user profiles and understand customer sentiment about a company's brand and products. SMA may be a part of a CRM system, giving companies very rich data about their customers. Sometimes you will hear the term digital (marketing) analytics, which is a broad term for anything digital marketing. So, web analytics and social media analytics would be examples of digital marketing.

In addition to social media websites, companies also need data about the current state of the economy, business conditions, population trends, and demographics of (potential) customers. Many cities, states, and countries provide free data (see <https://www.data.gov/open-gov/>) that can be used. For example, New York City has a treasure trove of data available for its agencies at <https://opendata.cityofnewyork.us/>. Another potential source is the U.S. Census Bureau Data (<https://www.census.gov/data.html>), which provides both location and demographic data. Companies can use this data to identify target markets and where to concentrate marketing

efforts. For economic conditions, companies can turn to the U.S. Bureau of Economic Analysis, U.S. Small Business Administration General Business Data and Statistics, United Nations UNData, and WorldBank Data.<sup>8</sup> If public opinion data is desired, Pew Research Center (<https://www.pewresearch.org/>) provides free opinion research on a variety of topics. A variety of organizations also provide information for a fee, including Lexis Nexis (for full text articles), Nielson (for purchasing and viewership data), Statista (for industry) and Experian (for credit, demographic, and purchasing)<sup>9</sup> – all of which can be incorporated into marketing analytics to help improve a company's marketing strategy.

## (LEVEL 2 HEADER) COMBINING THE DATA

Based on the above discussion, companies can use a wide variety of internal and external data for marketing analytics. To assist with combining and analyzing this heterogeneous data, companies might choose to use a **data warehouse**. A data warehouse is a core component of business intelligence, and can help companies transform their data into actionable intelligence. Data warehouses are HUGE relational databases of structured data from a variety of sources (e.g., CRM, ERP/ES). Data is first extracted from the source systems; cleaned for consistency (e.g., Street is always abbreviate St); transformed into the proper (predefined) relational

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<sup>8</sup> The data listed is available at the following websites: <https://www.bea.gov/>; <https://www.sba.gov/about-sba/sba-performance/open-government/digital-sba/open-data/open-data-sources>; <http://data.un.org/>; and <https://data.worldbank.org/>

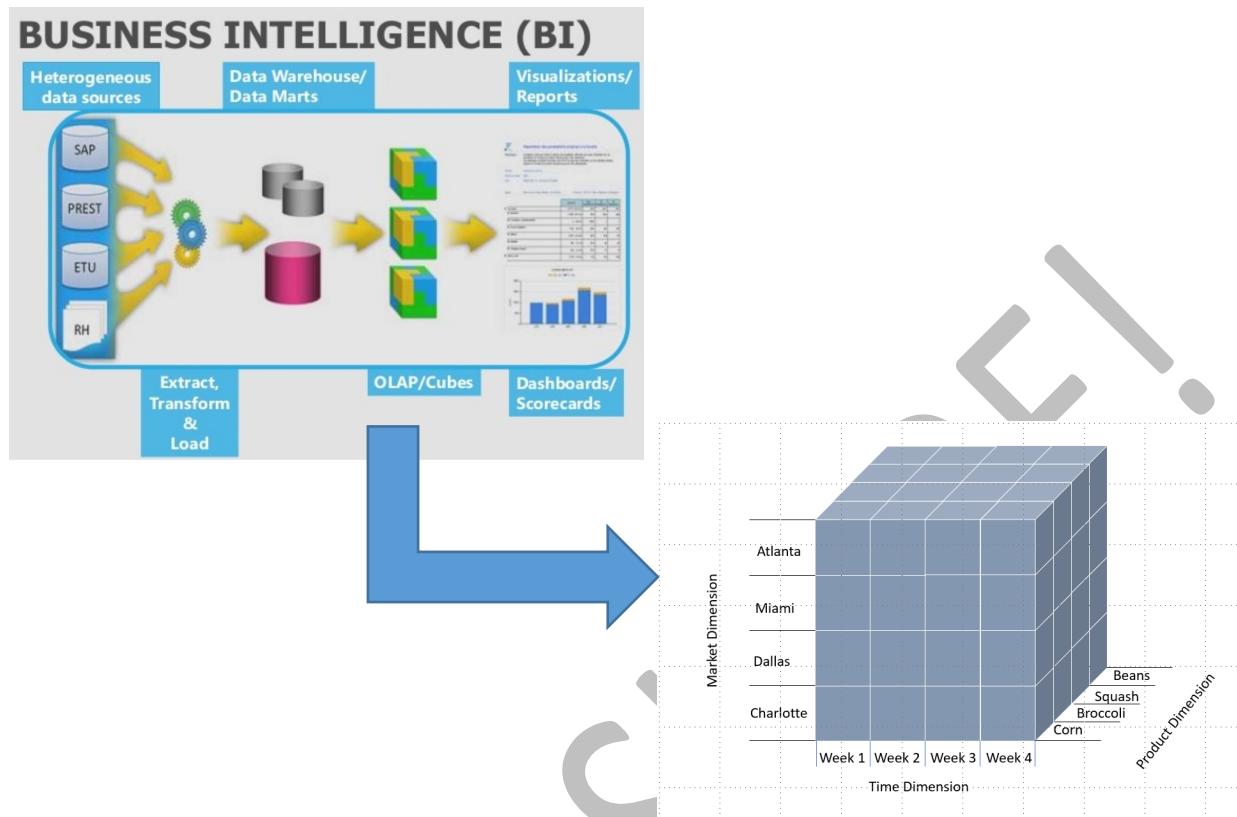
<sup>9</sup> The data listed is available at the following websites: <https://www.lexisnexis.com/en-us/gateway.page>; <https://www.nielsen.com/us/en/>; <https://www.statista.com/>; and <https://www.experian.com/> The information in this paragraph is based on: Marketing Data Sources. Available on-line at: <https://courses.lumenlearning.com/marketing-spring2016/chapter/reading-marketing-data-sources/>, accessed 05/18/2020.

(structured) database format (i.e., rows and columns like an Excel spreadsheet);<sup>10</sup> and then loaded into the data warehouse for analysis. A data warehouse is designed to be the “single source of truth” for company data.

To increase performance, companies may extract part of the data warehouse to create smaller data marts for different business functions (e.g., HR, finance, marketing). In addition, companies may extract data to create **OLAP (Online Analytical Processing) cubes** which store compressed, multidimensional data for faster analytics processing (i.e., all possible combinations are pre-calculated because speed is the number one goal). So, to assist in marketing analytics by end users, companies can create a marketing data mart and a marketing OLAP cube. Exhibit 7.6 provides an overview of this process, including an example of a multidimensional OLAP cube for a U.S. vegetable distributor. The Exhibit shows that data from many sources is extracted, transformed into the proper format and then loaded into a data warehouse and/or data mart. OLAP cubes are then created with pre-calculated values for each time, market, and product combination. The data can then be analyzed to create visualizations and dashboards.

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<sup>10</sup> Data warehouses have fewer tables and more redundancies than transactional relational databases in order to speed up analytic/reporting processing.



**[[Insert Exhibit 7.6 here]]**

#### Exhibit 7.6 Data Warehouse

Source: Puneet's Blog. 2016. Business Intelligence. Available on-line at:  
<http://puneet.dbsdataprojects.com/2016/04/24/business-intelligence/>, accessed on 05/18/2020.

Given that much of the marketing data is unstructured (e.g., texts, tweets, blogs, emails), companies may also want to implement a data lake. Unlike a data warehouse that transforms/stores data in a predefined relational database format, a **data lake** stores data in its natural (structured, semi-structured, and unstructured) form. Data lakes allow more analytic flexibility as there is no predefined structure (rather the structure is defined when the data is needed), but typically require strong technical skills to access the data. Marketing analytics of a

data lake typically use advanced technologies like those discussed in Chapter 11. Exhibit 7.7 compares data warehouse, data marts, and data lakes.

	Data Warehouse	Data Mart	Data Lake
Purpose	Data for reporting, business intelligence, and visualization	Data used by a specific department (or group) for analytics	Big data analytics, predictive analytics, machine learning, and data discovery
Use	Strategic decision making (by upper management)	Tactical decision making (by middle management) to implement strategic decisions	To be determined
Amount of data	Predefined relevant data for analysis, 100 GB to 1 TB+	Limited/Focused, less than 100 GB	Any data that might be potentially used, Petabytes+
Sources	Multiple (relational) databases	Data Warehouse or few relational systems	Unlimited (e.g., websites, mobile apps, sensors, ES)
Storage	Relational	Relational	Various
Benefit	One historical truth	Easy, fast access	Analytic flexibility

**[[Insert Exhibit 7.7 here]]**

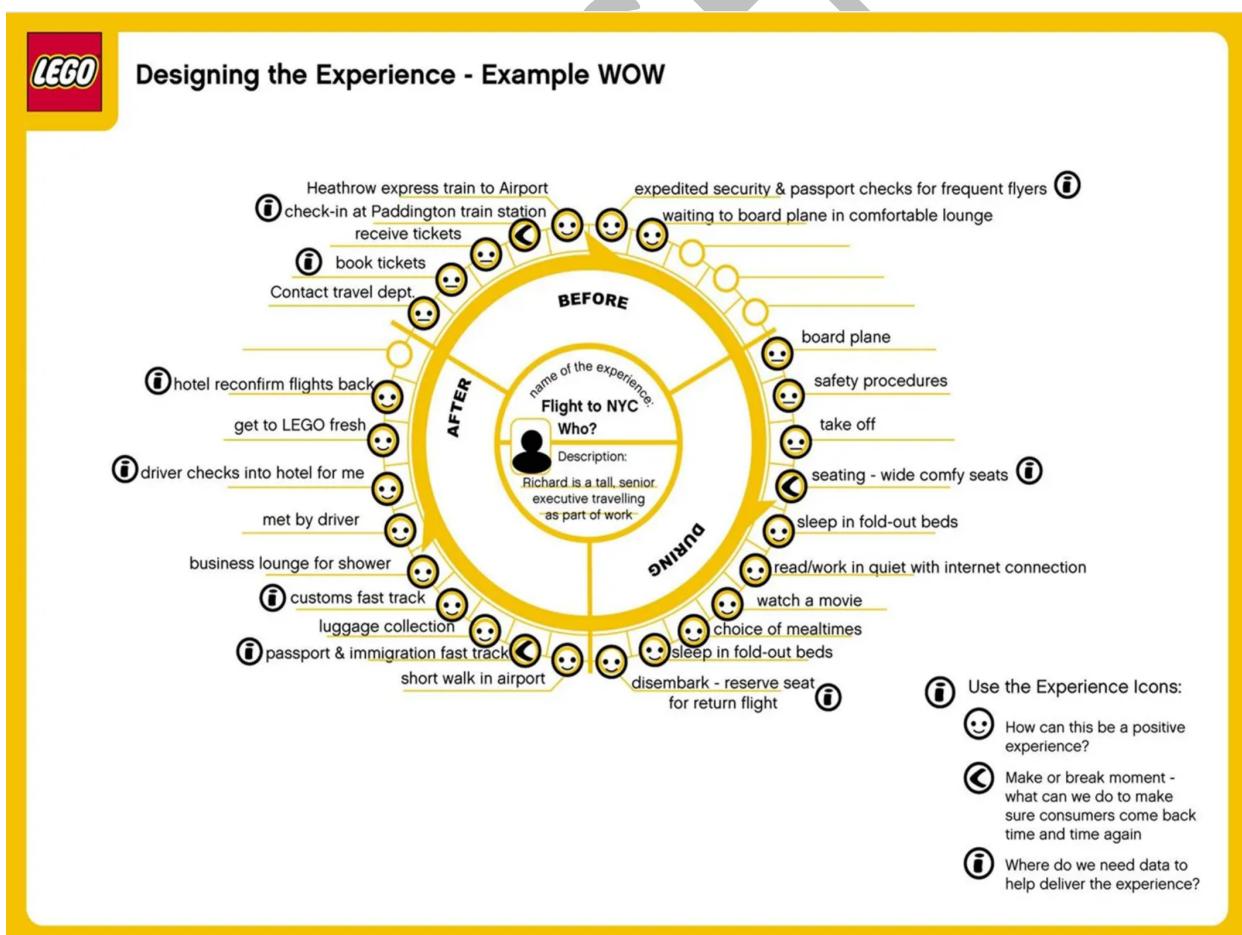
#### Exhibit 7.7 Data Warehouse, Data Marts, and Data Lakes

Based on: Bohtelho, Bridget. 2019. Data warehouse vs data mart vs data lake: Beyond the RDBMS. Available on-line at: <https://searchdatamanagement.techtarget.com/feature/Beyond-the-RDBMS-Data-warehouse-vs-data-lake-vs-data-mart>, accessed on 06/22/2020.

Another way to pull everything together is to use customer journey analytics to link all of the interactions recorded in the company's CRM. A customer journey is visual representation of the experience that a customer has with a company. In other words, a customer journey shows a customer's interactions or touchpoints with a company. **Customer journey analytics** tracks

and analyzes how customers used different channels to interact with a company across time. Thus, it helps companies determine which touchpoints are best at increasing revenue, so they can focus resources on those points.

There is no set customer journal map. It varies from company to company. For example, Lego uses an experience wheel. Exhibit 7.8 presents an example of Lego's experience wheel for a flight from London's Heathrow airport to New York City (unfortunately, Lego will not share its ACTUAL experience wheel!). It shows the interactive points as well as the corresponding customer's (probable) emotional response. The wheel is used to highlight areas that need improvement.



**[[Insert Exhibit 7.8 here]]**

Exhibit 7.8 Customer Journey Map: Lego Experience Wheel Example

Source: 4 Effective Customer Journey Map Examples. Available on-line at:

<https://www.act.com/en-uk/blog/customer-journey-map-example>, accessed 05/19/2020.

Progress Check:

4. Identify sources of internal data that can be used for marketing analytics.
5. Identify sources of external data that can be used for marketing analytics.
6. How can companies combine all of the marketing data to gain insights to inform marketing decisions?

(Comp: please insert in the margin: “LO7-4: Describe and provide examples of descriptive analytics used to answer marketing questions.”)

**(LEVEL 1 HEADER) ANALYZE MARKETING DATA**

**(LEVEL 2 HEADER) DESCRIPTIVE MARKETING ANALYTICS**

Descriptive analytics simply describe or summarize the past. They help highlight the characteristics and features of a dataset by summarizing a large amount of data into an easy to understand format. They do not include any assumptions or future estimates/predictions.

Thus, descriptive analytics help us understand the *actual* data and what has already happened.

A wide variety of summarization and statistical techniques as well as simple visualizations are examples of what might be employed as part of descriptive marketing analytics.

**(LEVEL 3 HEADER) Statistical and Summarizations Techniques for Descriptive Analytics**

Summarization and statistical techniques are used to address basic questions of “What happened?” or “What is happening?” These techniques characterize, summarize, and organize data and are generally all found in spreadsheet software like Microsoft Excel. For example,

counts, totals, sums, averages, subtotals, minimums, maximums, pivot tables (to summarize), standard deviations, and ratios are all examples of descriptive analytics techniques that can be completed using Excel. In addition, analysts can use tools such as Excel to create simple graphs/visualizations like histograms, bar charts, and pie charts. Exhibit 7.9 provides examples of statistical techniques that can be used in descriptive marketing analytics for the different components of the marketing mix.

<b>Statistical Techniques to Perform Descriptive Analytics</b>	<b>Use</b>	<b>Example of Type of Marketing Question It Addresses</b>
<b>Counts</b>	Show how frequently an attempt occurs	How many users visited our website? How many website users did not purchase any products? How many website users purchased at least one product?
<b>Totals, sums, averages, subtotals</b>	Summary measures of performance	What was the average monthly sales revenue from a product in 202X? What was the average price of the product in 202X? How many total product units were sold in June? in each region? in each store?
<b>Minimums, maximums, medians, standard deviations</b>	Summary measures of dispersion	What are the top 10 products in terms of sales and profit in 202X? How much does sales revenue by salesperson vary?
<b>Graphs : bar charts, histograms</b>	Summary visualization	How much sales revenue for a product was generated in each marketing channel for 202X? How many units were sold by each salesperson in 202X?
<b>Pivot tables</b>	Flexible way to summarize large amounts of data	What were total sales for each month in 202X? by salesperson?

<b>Ratios</b>	Compares two numbers	What is the company website bounce rate in January (i.e., website users that enter the company website and immediately leave)? What is the conversion rate for the company website in May (i.e., website users that actually purchase)?
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Exhibit 7.9 Statistical Techniques for Marketing Descriptive Analytics

### (LEVEL 3 HEADER) Examples of Marketing Descriptive Analytics

Descriptive analytics give the basic statistics for marketing data and the marketing mix. For example, Rebrickable ([rebrickable.com](http://rebrickable.com)) is a website that tells how to “Combine your old Lego to build new creations.” The website also has a downloadable database of information on existing Lego sets beginning in 1949. Let’s use this data to answer the question: How many Lego sets does Lego release a year? Using the Descriptive Statistics menu option of the Data Analysis Add-in for Excel,<sup>11</sup> we can easily answer this question by generating descriptive statistics on Lego sets (i.e., the *product*) issued between 1949 and 2019. Exhibit 7.10 shows the mean, median, mode, standard deviation as well as other summary statistics. Based on the descriptive analytics, Lego has released 14,903 Lego sets in the 69 year period analyzed. In addition, the number of annual Lego sets launched has varied greatly (ranging from 3 to 832 sets) with an average almost 216 new Lego sets released each year.

<sup>11</sup> Lab 1 provides instructions for installing the Data Analysis Add-In.

<i>Count of set_num</i>	
Mean	215.9855072
Standard Error	28.07631402
Median	104
Mode	39
Standard Deviation	233.21938
Sample Variance	54391.2792
Kurtosis	0.602209655
Skewness	1.266157407
Range	829
Minimum	3
Maximum	832
Sum	14903
Count	69

Exhibit 7.10 Summary Statistics for Lego Set Releases for 1949 – 2019.

(Source: <https://rebrickable.com/downloads/>, sets.csv.gz, accessed 05/22/2020)

**Lab Connection:** Labs 7-1 and 7-2 provide step-by-step instructions on how you can use different features in Excel to generate descriptive analytics.

We can also use Tableau to easily generate a horizontal bar chart to answer the following question: Which Lego theme had the most Lego sets released in 2019? Exhibit 7.11 depicts a Tableau visualization which combined two Rebrickable tables (sets and themes) to generate the bar chart. Based on the chart, the themes with the most set releases in 2019 are Gear, Star Wars, Friends, and Ninjago.

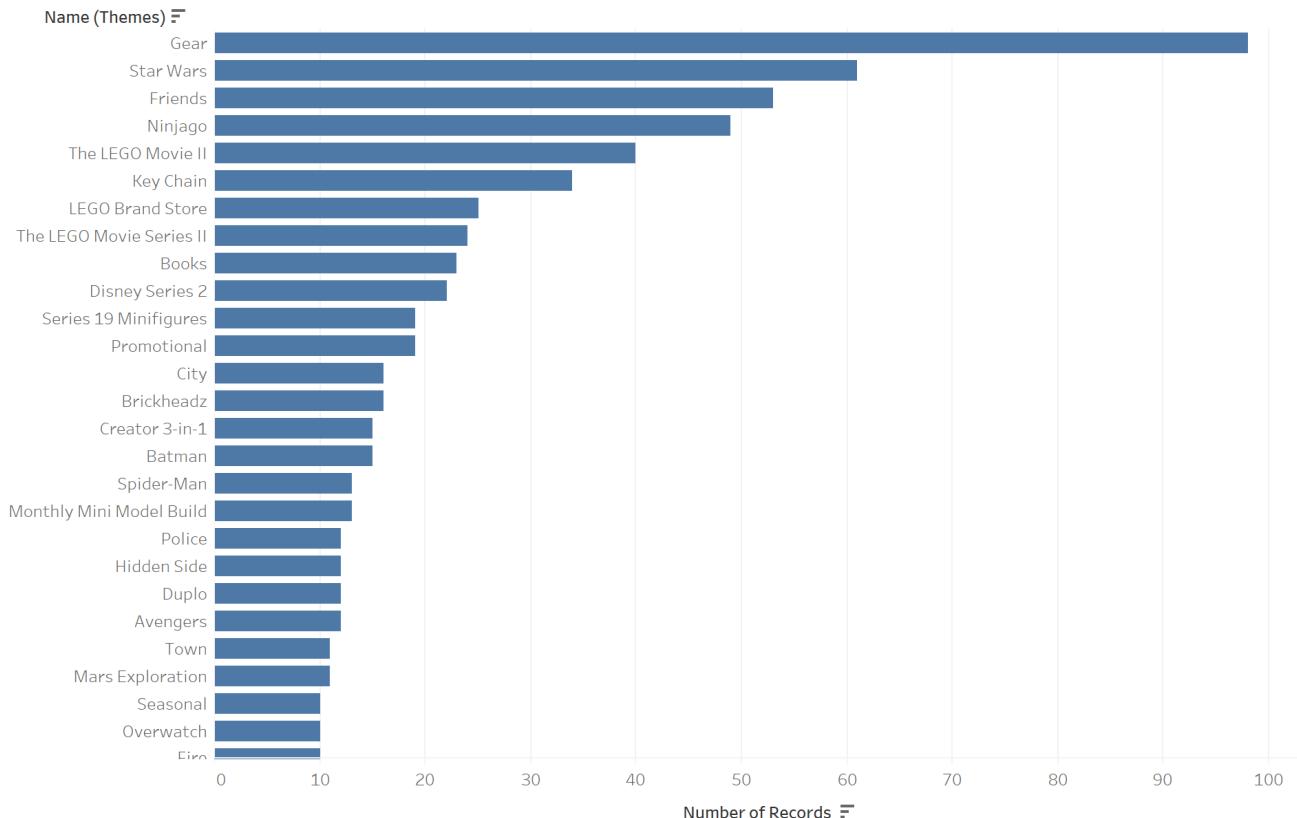


Exhibit 7.11 Horizontal Bar Chart for Lego Set Releases by Theme for 2019.

(Source: <https://rebrickable.com/downloads/>, sets.csv.gz and themes.csv.gz, accessed 05/22/2020)

**Lab Connection:** Lab 7-3 provides step-by-step instructions on how to create a histogram in Tableau.

Regarding the *place* of the marketing mix, we can answer the question: How did the number of Lego stores change in 2019? Exhibit 7.12 shows what Lego Group reported in the summary of its 2019 financial results. In 2019, Lego opened 150 new stores around the world, bringing the total to 570 Lego stores. Lego could have also stated the number of stores grew by 36 percent ( $150/(570-150) * 100$ ) in 2019. Website traffic increased by 27% as well.



Exhibit 7.12 Summary Statistics for Lego Set Releases for 1949 – 2019.

(Source: The LEGO Group 2019 Financial Results. Available at: <https://www.lego.com/en-us/aboutus/news/2020/march/annual-results-assets>, accessed 05/25/2020.

### (LEVEL 3 HEADER) Examples of Descriptive Analytics in Marketing: Key Performance Indicators (KPIs)

"If you don't *measure* it, you can't *improve* it."

Chris Getman, vital

Source: <https://vtldesign.com/digital-marketing/16-marketing-kpis-to-measure/>

An integral part of both marketing descriptive and diagnostic analytics is key performance indicators (KPIs). **KPIs** are numerical metrics used to gauge company performance. The possible number of KPIs is endless. Each company determines which KPIs are the most crucial for the business and how they should be broken down (e.g., channel, product, region, store).

Below are examples of KPIs used in marketing<sup>12</sup>:

- Sales revenue. This KPI can be measured in total, average, per visit, and/or as a percent change from a prior period.
- Leads. Leads are contacts for potential customers. Leads can be broken down into:
  - marketing qualified leads (MQLs): consumer that expressed some interest in the product (e.g., download a white paper from the company's website).
  - sales qualified leads (SQLs): consumer more likely to purchase and worthy of sales pursuit.
  - Lead-to-Close or Lead-to-Customer = (# leads purchasing) / (# of leads received)/.

<sup>12</sup> This section is based: Getman, Chris. 31 Marketing KPIs to Use in Your Campaign. Available at: <https://webris.org/marketing-kpis/>, accessed 05/25/2020.

- Customer Life Time Value. This KPI is the value of a customer over the customer's lifetime. This KPI can be based on sales revenue or gross margin (so after costs). We prefer the gross margin approach = sales revenue \* gross margin \* average # of repeat purchases.
- Customer Acquisition Cost. Cost can be calculated per visit, per sale, and/or per customer (customer acquisition cost = total marketing investment/customers acquired).
- Website. Website traffic (i.e., number of visitors), page views, session duration, bounce rate (i.e., website users that enter the company website and immediately leave), cart abandonment rate (i.e., website users that put product in the cart but do not buy), **conversion rate** (i.e., potential customers that actually purchase product(s)), followers, new visitors, key words.
- Other. Newsletter/email open and click through rates, call rate, likes/dislikes, product/service quotes, store traffic.

Exhibit 7.13 presents sample KPIs generated by an eCommerce personalization analytics tool called Barilliance over the last 7 days for a company. The exhibit shows that the company's website had 227,483 visitors. 20,335 (71%) abandoned their shopping carts (i.e., left items in the cart without buying), which contained over \$1 million in products. The exhibit also shows that 47% of emails sent were opened, leading to 349 sales. An overall conversion rate (i.e., potential customers that actually purchased product) can also be calculated (less than 2 percent,  $100 * 349/20,307$ ).

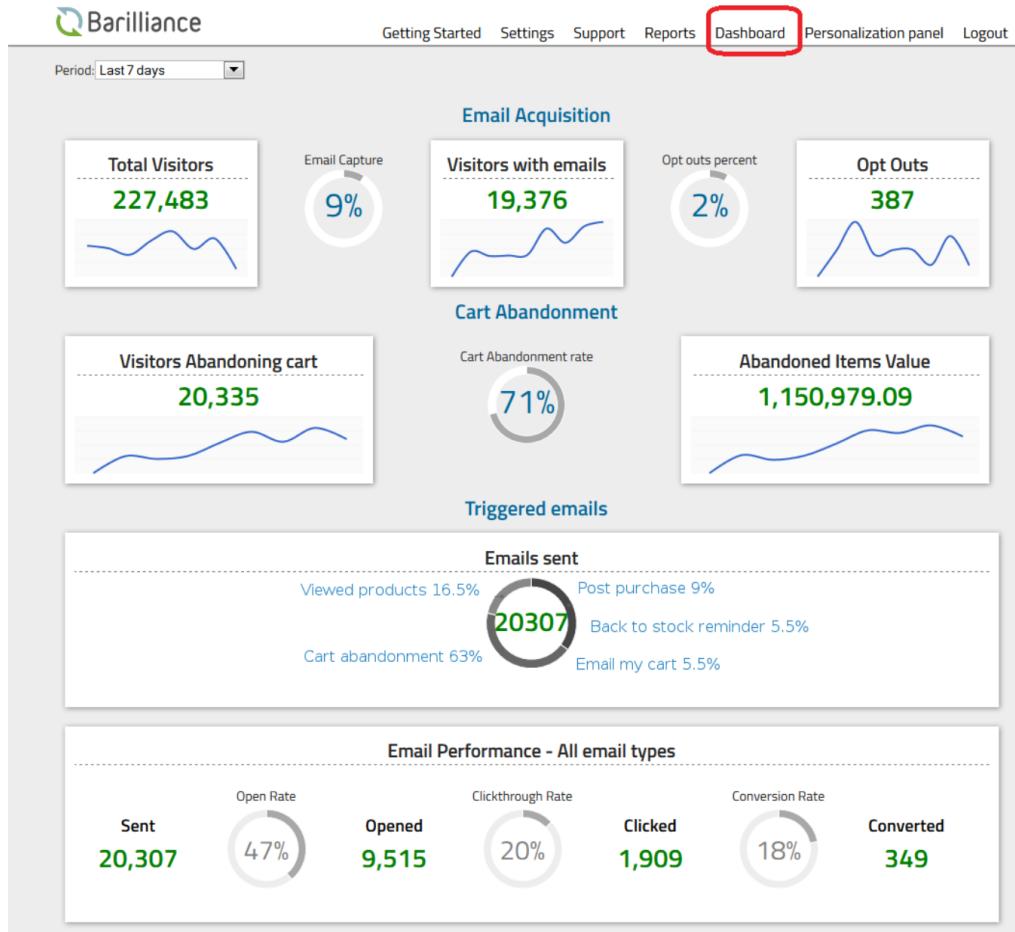


Exhibit 7.13 Sample KPIs by Barilliance.

(Source: <https://www.barilliance.com/cart-abandonment-rate-statistics/>, accessed 05/22/2020)

### Progress Check

7. How are bounce rate and conversion rate related?

(Comp: please insert in the margin: “LO7-5: Describe and provide examples of diagnostic analytics used to answer marketing questions.”)

### (LEVEL 2 HEADER) DIAGNOSTIC MARKETING ANALYTICS

“Eliminate all other factors, and the one which remains must be the truth.”

Sherlock Holmes, by Arthur Conan Doyle, The Sign of the Four (1890)

Diagnostic analytics helps to answer the questions: “Why did it happen?”, “What are the reasons for the past results?”, and “Can we explain why it happened?” In other words,

diagnostic analytics attempts to identify the root cause (or the factor that initiated the chain of events), which cannot often be uncovered by just performing descriptive analytics. Diagnostic analytics helps to evaluate the relations, patterns, and linkages between variables that might be related to an anomaly. This often requires combining multiple datasets and sometimes using external (not just internal) data. We provide examples of this process for marketing.

### (LEVEL 3 HEADER) Identifying anomalies/outliers

Often a first step in diagnostic analytics is to look for and identify unusual, unexpected results (i.e., an anomaly/outlier). Exhibit 7.14 details some anomalies for the marketing mix components and provides some possible explanations.

Marketing Mix Component	Expectation	Example of Anomaly	Possible Explanations for the Anomaly
Product	Our most popular product will continue to sell well.	Product sales are dropping.	A competitor introduced a similar product with more features for about the same price. A recession reduced consumers' discretionary income.
Price	Market will grow over time for a new product.	Market growth rate is low (or almost non-existent).	Price is too high. Lower price needed to attract new customers. A competitor introduces a new product.
Place	Sales of a product will be the same at all stores.	One store suddenly sells less product than other stores.	A new mall was built nearby and mall traffic has decreased.

			Road construction made getting to the store difficult.
Promotion	Website revenue will continue to grow.	Website revenue is down 10%.	Promotional email click rate and conversion rate has dropped. Promotions were so successful that the increased traffic wound up crashing the website. A Denial-of-Service attack crashed the website.

Exhibit 7.14: Examples of Marketing Anomalies for Components of the Marketing Mix

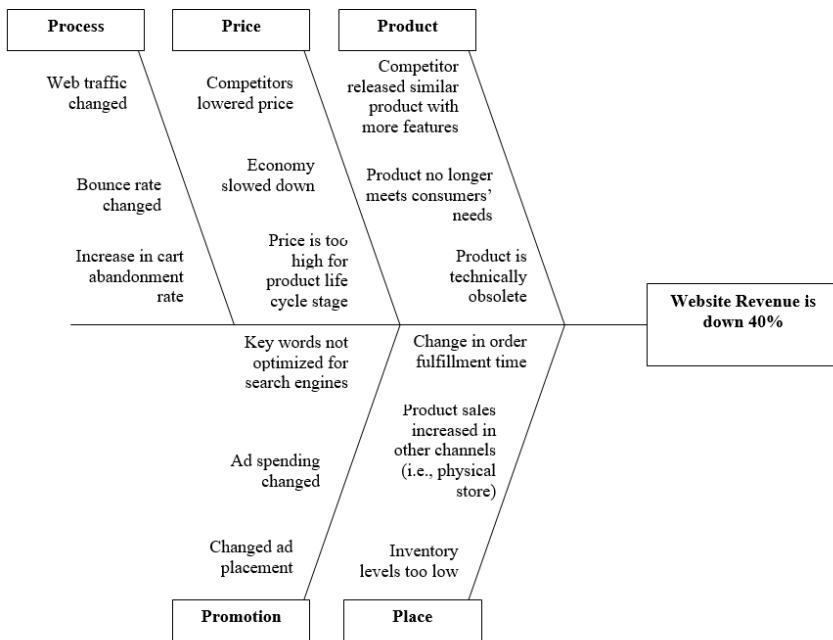
Once the identified unexpected results have been identified, a company can then investigate to understand exactly why the results occurred. Root cause analysis is often used to understand what is driving the (unexpected) change.

### (LEVEL 3 HEADER) Root cause analysis

**Root cause analysis** is the process of determining what factor, or factors, caused a change. The root cause can drive the change itself or trigger a series of other events that eventually result in the change. Moreover, there may be more than one root cause. Root cause analysis focuses on the internal and external factors with the highest probability of causing the change. Analysis includes factors that can be split into four groups: unrelated, correlated (i.e., other symptoms of the root cause), contributing (i.e., a factor in a chain of events), and root cause. If the anomaly has a negative impact on the company, the root cause is what needs to be fixed. If the

anomaly has a positive impact on the company, the root cause needs to be leveraged across the company!

One method to identify the root cause is to place suspected factors in a timeline, keeping in mind that the root cause could have happened days, weeks, or months before the change—especially if it involves a chain of events. A second method is a visualization technique called an Ishikawa diagram (a.k.a., fishbone, herringbone, and cause-and-effect diagram). The Ishikawa diagram captures the underlying factors (and the relationships) that may be the root cause of the problem. It should include all possible causes (including unrelated, correlated, contributing, and root). Exhibit 7.15 shows an Ishikawa diagram listing the primary factors that could explain why website revenue is down 10% categorized by the 4 traditional Ps as well as Process (one of the new Ps mentioned in LO7-1), which captures KPIs about the customer's interaction with the website.



### Exhibit 7.15: Ishikawa Diagram Example

Using Exhibit 7.15's Ishikawa diagram as a guide, the listed factors can be analyzed to uncover additional details hidden in the data. Techniques to reveal the hidden information includes summarizing the data at different levels as well as drilling down, up and through, which give you more, less, and alternative views of the data, respectively. The goal is to find patterns or linkages in the underlying dataset or with an external dataset as described below in the next section. The KPIs introduced in the descriptive analytics section are often also used in diagnostic analytics. The difference is that descriptive analytics would calculate a KPI at one point in time, while diagnostic analytics would see how the KPI changed over time.

Exhibit 7.16 provide a summary of the techniques that can be used for diagnostic analytics and examples of the types of marketing questions that can be answered.

Statistical Techniques to Perform Diagnostic Analytics	Use	Example of Type of Marketing Question It Addresses
<b>Summarization</b>	Shows how totals vary at different levels of granularity.	How many website visitors actually make a purchase?
<b>Pivot table/Cross Tabulation</b>	Groups variables to understand the relationships between them. Allows drill down and drill up.	What is the future purchasing behavior of customers that buy in the same month (cohort analysis)?
<b>Correlation</b>	Extent to which variables are related to each other.	What is the relationship between promotional emails and sales revenue?
<b>Regression</b>	Examines whether there is a relationship between an independent input variable and dependent outcome variable.	What is the relationship between advertising expense and sales revenue?

<b>Hypothesis Testing</b>	Tests whether variables are significantly different.	Has website traffic significantly dropped between two time periods?
<b>Sales Funnel Chart</b>	Shows the conversion rate at each step in the sales process using an inverted pyramid visualization showing the number of (potential) customers at each step.	What percentage of customers that ask for a quote on a product make a purchase?

Exhibit 7.16: Diagnostic Analytics Techniques and Examples

### (LEVEL 3 HEADER) Examples of Diagnostic Analytics in Marketing: Sales and Web Traffic<sup>13</sup>

Let's assume that LEGO has experienced a drop in sales from its website. Using this scenario, we illustrate Diagnostic Analytics using several of the techniques to answer the question: Why has sales revenue dropped for the company's website? After consulting the Ishikawa Diagram in Exhibit 7.15, we investigate web traffic. Using the CORREL function in Excel, we find that the correlation between sales revenue and web traffic (as shown in Exhibit 7.17) to be highly correlated (but don't forget correlation does not always mean causation). We then used Tableau to graph sales revenue and web traffic both summarized by month (as shown Exhibit 7.18). As can be seen, both figures drop in January of 2023. Continuing to drill down, we then compare daily figures from December 2022 to February 2023 (in Exhibit 7.19), finding that on January 5 web traffic dropped sharply. Further analysis reveals that on January 5, the search engine algorithm changed causing a drop in web traffic. To solve the problem, LEGO would need to update its key words to be optimized for the new algorithm.

Sample Data			Correlation Analysis
Day	Traffic	Revenue	=CORRELL(B2:B425, C2:C425)
1/1/2022	1,045	31,350	

<sup>13</sup> The content in this section was inspired by: Rajeck, Jeff. 2017. Analytics approaches every marketer should know #2: Diagnostic Analytics. Available on-line at: <https://econsultancy.com/analytics-approaches-every-marketer-should-know-2-diagnostic-analytics/>, accessed 06/04/2020.

1/2/2022	1,093	31,697
1/3/2022	1,168	28,032

=0.811699

Exhibit 7.17: Correlation Analysis in Excel

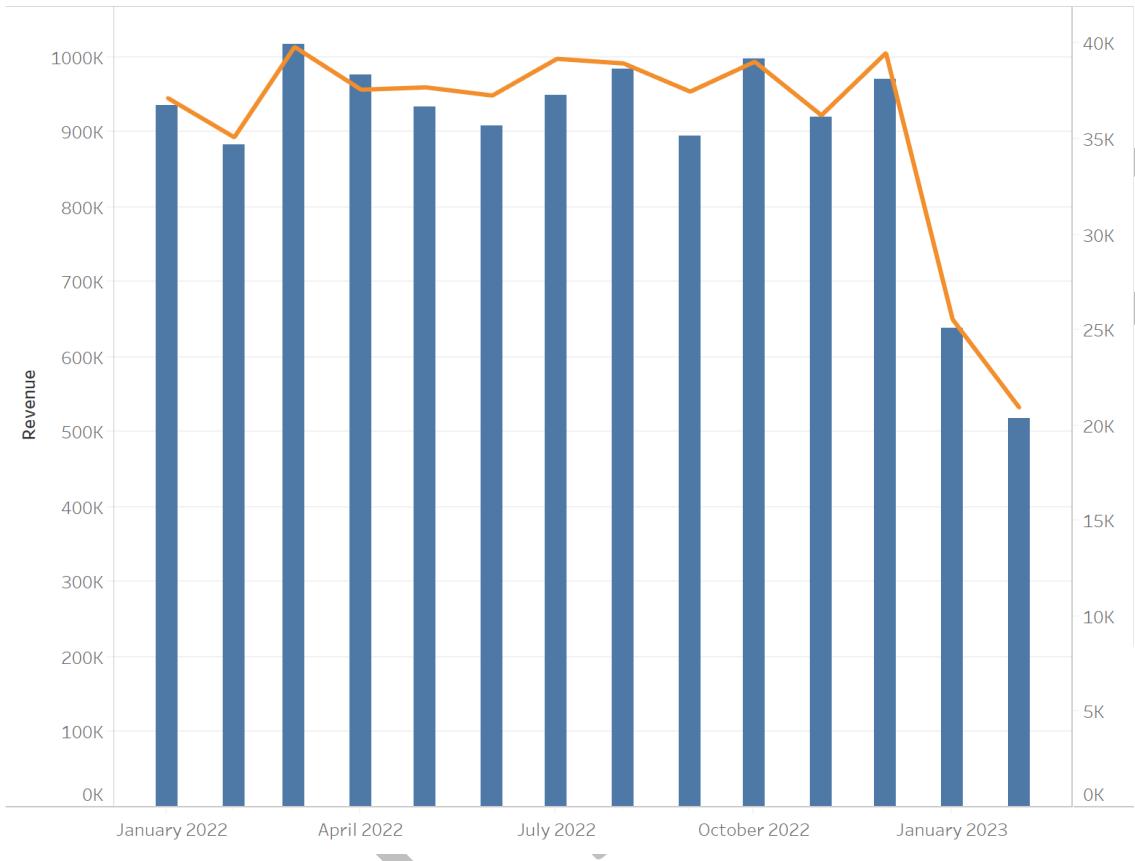


Exhibit 7.18: Diagnostic Analysis in Tableau Summarizing by Month

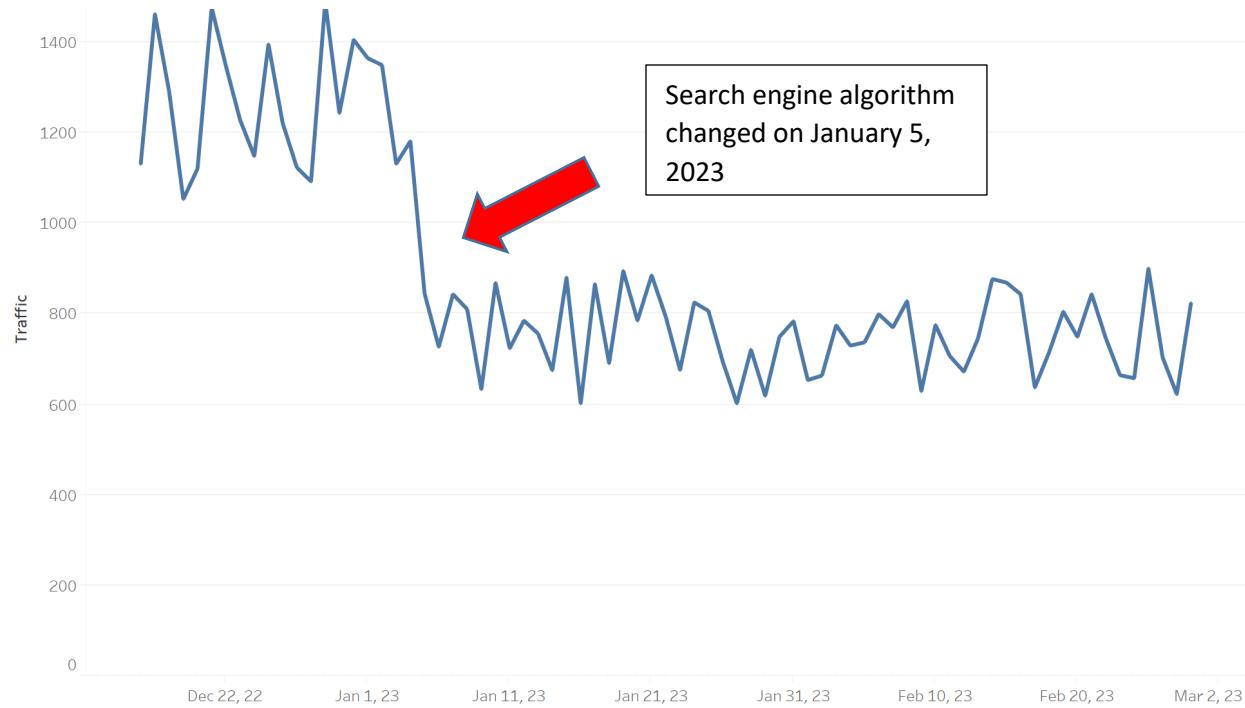


Exhibit 7.19: Diagnostic Analysis in Tableau Using Daily Website Traffic Data

**Lab Connection:** Lab 7-4 provides step-by-step instructions on how to analyze website data using another diagnostic technique called a funnel chart.

#### Progress Check

8. What is the difference between drill down, drill up, and drill through? If a company wanted to look at data in a different manner than current presented but at the same summarization level, which method would be appropriate (i.e., drill down, drill up, or drill through)?

(Comp: please insert in the margin: "LO7-6: Describe and provide examples of predictive analytics used to answer marketing questions.")

#### (LEVEL 2 HEADER) PREDICTIVE MARKETING ANALYTICS

Predictive analytic answers the questions: "What will happen in the future?", "What is the probability something will happen" or "Is it forecastable?" The goal is to predict future performance using historical data and a user-specified algorithm, which is basically instructions on how to combine the data. So, unlike descriptive and diagnostic analytics, which describe things we know are true, predictive analytics describes things that possibly might happen.

We break predictive analytic techniques into three broad categories: (1) classification, (2) regression, and (3) decision trees.<sup>14</sup> Exhibit 7.20 outlines the three predictive analytics techniques, how they are used, and an example of a marketing question that can be addressed by the technique.

Statistical Techniques to Perform Predictive Analytics	Use	Example of Type of Marketing Question It Addresses
<b>Classification</b>	Separates a dataset into two or more predefined "like" groups.	Which customers are more likely to buy again?
<b>Regression</b>	Predicts a specific dependent variable outcome based on relationship between independent and dependent variables.	What will sales be if the pay per click rate is increased?
<b>Decision Tree</b>	Predicts a specific dependent variable based on a pathway that includes all action points with associated probabilities.	Which marketing activities will generate more sales?

Exhibit 7.20: Predictive Analytics Techniques and Examples

### (LEVEL 3 HEADER) Example of Predictive Analytics in Marketing: Decision Tree for Product Development

A decision tree is a decision support tool that visually shows various outcomes from different (sequential) decisions. Each branch represents different decisions. The decision tree may also include probabilities and costs of different paths, allowing expected value calculations.

Decision trees are used to help develop a strategy to achieve a desired outcome. To be effective, all possible pathways need to be included and each pathway should be mutually

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<sup>14</sup> Decision trees can be used to create classification trees (for categorical data) and regression trees (for continuous data).

exclusive (i.e., if one path is selected, another path cannot also be used). The beauty of the decision tree is that it: is simple making it easy to understand, visualize, and interpret; can handle nonlinear relationships that may be difficult to analyze using other techniques; and requires minimal data prep.

Let's assume that LEGO is trying to answer the question: Should the company expand its product offerings or focus on strengthening sales of existing products? Exhibit 7.21 presents the decision tree for this question. The top branch shows the decision to expand the product line. The bottom branch shows the decision to focus strengthening existing product sales. The tree diagram also shows the potential outcomes, associated probabilities, and net profit. For example, designing new products can result in zero new products, one new product, or many new products with projected net profits of -\$40, \$105, \$200 with 40%, 45%, and 15% probability, respectively. Using this information, the expected value of this decision is:  $(0.4 * \$40 + 0.45 * \$105 + 0.15 * \$200) = \$54$ . Based purely on expected value, the company should choose this option because 56K is greater than \$42.5. However, other factors (e.g., shortage of LEGO designers, management's long-term vision) may be considered when deciding which option to pursue, leading to a different decision.

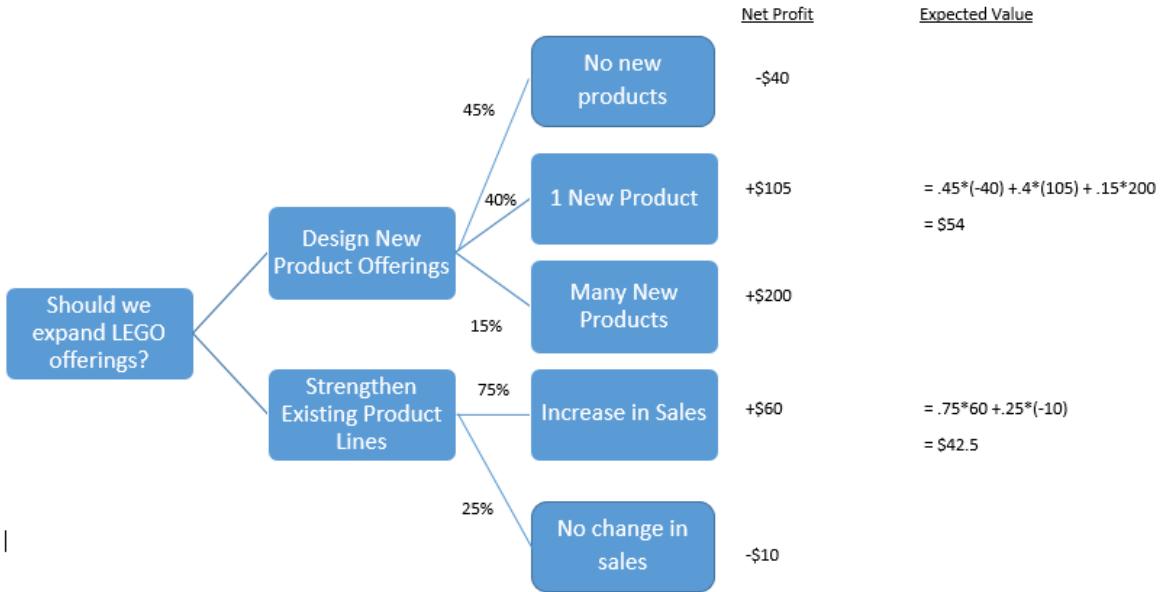


Exhibit 7.21: Predictive Analytics Tree Diagram Example

**Lab Connection:** Labs 7-5 and 7-6 provide step-by-step instructions on how to analyze data using regression, which is another predictive technique. Lab 7-5 provides instructions on how to do regression in Excel, while Lab 7-6 provides instructions on how to add a trend line to a scatter plot in Tableau.

### Progress Check

- Which predictive analytic technique should be used to determine what impact a change in customer satisfaction would have on sales revenue?

(Comp: please insert in the margin: “LO7-7: Describe and provide examples of prescriptive analytics used to answer marketing questions.”)

### (LEVEL 2 HEADER) PRESCRIPTIVE MARKETING ANALYTICS

Prescriptive analytics answers the questions: “What should we do based on what we expect to happen?” and “How do we optimize our performance based on potential constraints?” While both predictive and prescriptive analytics make predictions about the future, prescriptive

analytics recommends a course of action. Exhibit 7.22 identifies some prescriptive analytics techniques as well as examples of marketing questions that each technique could answer.<sup>15</sup>

Statistical Techniques to Perform Prescriptive Analytics	Use	Example of Type of Marketing Question It Addresses
<b>Cash Flow Analysis</b>	Evaluates future cash flows for potential investments or expenditures. It typically uses net present value (NPV) internal rate of return (IRR)	Which marketing campaign should the company invest in?
<b>Goal Seek Analysis</b>	What if analysis that allows determines the required input value(s) to get a desired output (backwards analysis).	How much improvement in conversion rate is needed to sell 100,000 units?
<b>Optimization</b>	The process of making something as effective as possible.	Which social media platform responds best to ads?
<b>Scenario Analysis</b>	What if analysis that examines the effect of changing <i>multiple</i> input variables at the same time on an outcome variable (typically, base/most likely, worst, and best cases).	What is the number of products sold given the worst case for projected changes in the overall economy?
<b>Sensitivity Analysis</b>	What if analysis that examines the effect of changing <i>one</i> input on an outcome variable.	What happens to forecasted net income if units sold increases by 25%?
<b>Sentiment Analysis</b>	Determines the emotion behind words.	What marketing campaign should the company use to generate positive customer reviews?

Exhibit 7.22: Prescriptive Analytics Techniques and Examples

### (LEVEL 3 HEADER) Example of Prescriptive Analytics in Marketing: Cash Flow Analysis

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<sup>15</sup> Optimization and Sentiment Analysis typically involve advanced techniques. Therefore, they are discussed in Chapter 11.

Cash flow analysis examines the cash inflows and cash outflows for a company. Net present value (NPV) takes into account the time value of money (i.e., a dollar today is worth more than a dollar in ten years because today's dollar could be invested to earn more money) and can be used by companies to make decisions. Generally speaking, companies would prefer projects/investments with a higher NPV. NPV quantifies the best option, but there may be other factors to take into consider (e.g., management's long-term strategic plan).

To see how NPV works, assume that LEGO is deciding between two potential advertising campaigns. Unlike descriptive and diagnostic analytics, we will have to make some assumptions to answer the question: which advertising campaign should LEGO launch? Assume that: (1) the company wants to spend \$5 million on one of two new advertising campaign; (2) the expected net cash inflows for both campaigns are \$5.6 million but over different time periods; and (3) the estimated discount rate is 8%. Just looking at the net cash inflows, it appears that LEGO should be indifferent between the two campaigns since both have expected cash inflows of \$5.6 million. However, the timing of the cash inflows results in different NPV. The Excel NPV function, as shown in Exhibit 7.23, calculates the NPV as negative for campaign #1 and positive for campaign #2, because campaign #2 generates its cash flows sooner than campaign #1. Based on the NPV analysis, LEGO should launch campaign #2.

	A	B	C	D	E	F
1		Year	<u>Campaign #1</u>		<u>Campaign #2</u>	
2	Advertising Campaign Cost	0	(5,000,000)		(5,000,000)	
3	Annual Net Cash Inflows	1	1,400,000		3,500,000	
4		2	1,400,000		2,100,000	
5		3	1,400,000			
6		4	1,400,000			
7	Sum of cash inflows	Years 1-4	5,600,000		5,600,000	
8	Discount Rate		8%		8%	
9				Formula		Formula
10	PV of cash inflows		\$4,636,977.58	=NPV(\$C\$8,\$C\$3:\$C\$6)	\$5,041,152.26	=NPV(\$E\$8,\$E\$3:\$E\$4)
11	NPV of campaign (PV - Cost)		(\$363,022.42)	=C10+C2	\$41,152.26	=E10+E2
12	IRR		4.69%	=IRR(C2:C6)	8.65%	=IRR(E2:E4)

Exhibit 7.23: NPV Example for Advertisings Using Excel

Exhibit 7.23 also includes IRR, which stands for the internal rate of return. IRR is used to evaluate the profitability of investments. It is the interest rate that sets the NPV to zero. Generally speaking, companies would prefer projects/investments with the higher IRR (especially if the initial cost is the same). Campaign #1 has IRR equal to 4.69%, which is lower than the 8% discount rate (explaining why NPV is negative). Campaign #2 has an IRR equal to 8.65, which is higher than the 8% discount rate (explaining why NPV is positive). Based on IRR, LEGO should launch campaign #2.

**Lab Connection:** Lab 7-7 provides step-by-step Excel instructions on how to compare advertising campaigns using NPV.

#### (LEVEL 3 HEADER) Example of Prescriptive Analytics in Marketing: Scenario Analysis

What if LEGO really likes advertising campaign #1 the best and believes the NPV analysis above is not capturing all possible outcomes? Perhaps, LEGO's marketing group thinks that there may be several possible cash flow outcomes from advertising campaign #1: a likely, a low, a high, and a declining (i.e., high at first then low). Because LEGO wants to change the annual cash flows to see the impact on an outcome variable (i.e., the NPV) the company can perform a

scenario analysis to answer the question: Under which possible outcome would advertising campaign #1 be recommended?

Assume that the company believes that for net annual cash flows: (1) \$1,400,000 per year is the most likely outcome; (2) \$1,100,000 per year is the lowest possible outcome; or (3) \$2,000,000 per year is the highest possible outcome. The company also want to consider a “Declining” scenario where net annual cash flows start high and then decrease (\$2,000,000 in Year 1, \$1,400,000 in Years 2 and 3, and \$1,100,000 in Year 4). We can use the What-if Analysis Scenario Manager in Excel to simultaneously calculate multiple NPVs as shown in Exhibit 7.24 (where the row \$B\$9 is NPV).

A	B	C	D	E	F	G	H
1							
2		Scenario Summary					
3			Current Values:	Low	High	Declining	
5		Changing Cells:					
6	\$B\$2	1,400,000	1,100,000	2,000,000	2,000,000		
7	\$B\$3	1,400,000	1,100,000	2,000,000	1,400,000		
8	\$B\$4	1,400,000	1,100,000	2,000,000	1,400,000		
9	\$B\$5	1,400,000	1,100,000	2,000,000	1,100,000		
10		Result Cells:					
11	\$B\$9	(\$363,022.42)	(\$1,356,660.48)	\$1,624,253.68	(\$27,975.82)		
12	\$B\$10	4.69%	-4.92%	21.86%	7.72%		
13	Notes: Current Values column represents values of changing cells at time Scenario Summary Report was created. Changing cells for each scenario are highlighted in gray.						
14							
15							
16							

Exhibit 7.24: Scenario and NPV Analysis Example for an Advertising Campaign

Based on this analysis, because only the “High” scenario produces a positive NPV, the advertising campaign should only be pursued if LEGO believes the high level of sales is achievable. Additional analysis could also investigate the impact of the discount rate on the analysis and decision. The internal rate of return (IRR) could also be calculated for each scenario to determine the rate of return (in Exhibit 7.24 the \$B\$10 row is IRR).

#### Progress Check

10. What is the relationship between IRR and NPV? If NPV is positive, what can be said about the IRR?

(Comp: please insert in the margin: “LO7-8: Characterize how marketing analytics reports results.”)

#### (LEVEL 1 HEADER) REPORT THE RESULTS

As noted in Chapter 6, there are numerous ways to report the results. This chapter focuses on marketing dashboards. A **marketing dashboard** is a visual management tool that helps track and monitor KPIs to improve marketing effectiveness. Each company needs to decide not only what marketing KPIs are important for success, but also the best way to present them on the dashboard. One example of a marketing dashboard is Google Trends (<https://trends.google.com/trends/?geo=US>), which shows the number of times that a word is searched for using Google. Marketers use this information to direct traffic to the company’s website. Exhibit 7.25 presents the dashboard for the Google search term “Lego”. The top graph shows how frequently the term “Lego” has been entered in Google since 2004. The bottom visual shows the location of the users entering the term. So, the largest region of “Lego” searches come from users in Utah. Google Trends allows the user to customize the time

period and country as well as state, metro, or city location. Users can also identify another search term to “Compare”, producing a side-by-side comparison in the graph.

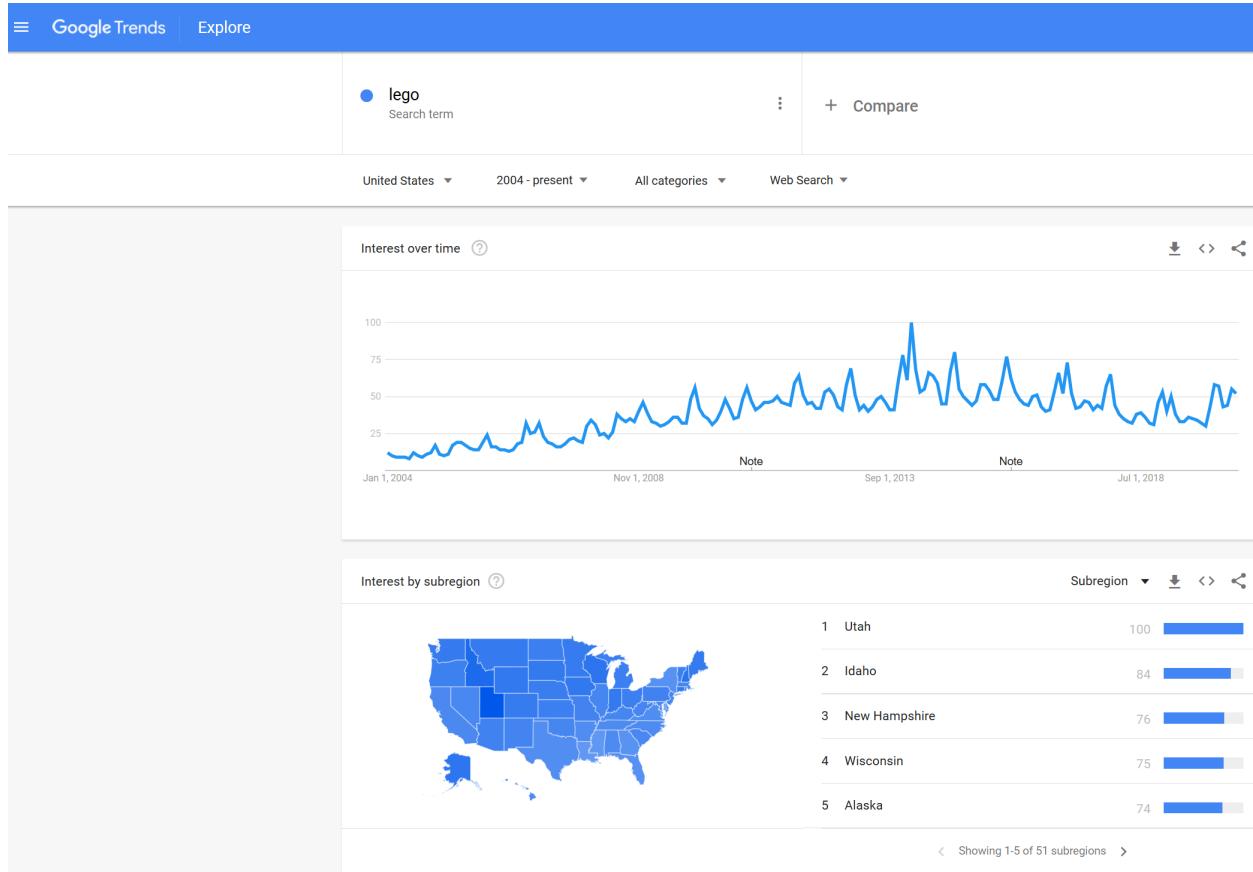


Exhibit 7.25: Google Trends for “Lego”

Source: <https://trends.google.com/trends/explore?date=all&geo=US&q=lego>, accessed 05/31/2020

Exhibit 7.26 shows an example of a marketing dashboard used by Klipfolio to monitor the effectiveness of its digital marketing initiatives. This dashboard focuses on digital analytics. It includes a variety of KPIs on leads as well as website usage and traffic and allows users to easily

monitor relevant KPIs.

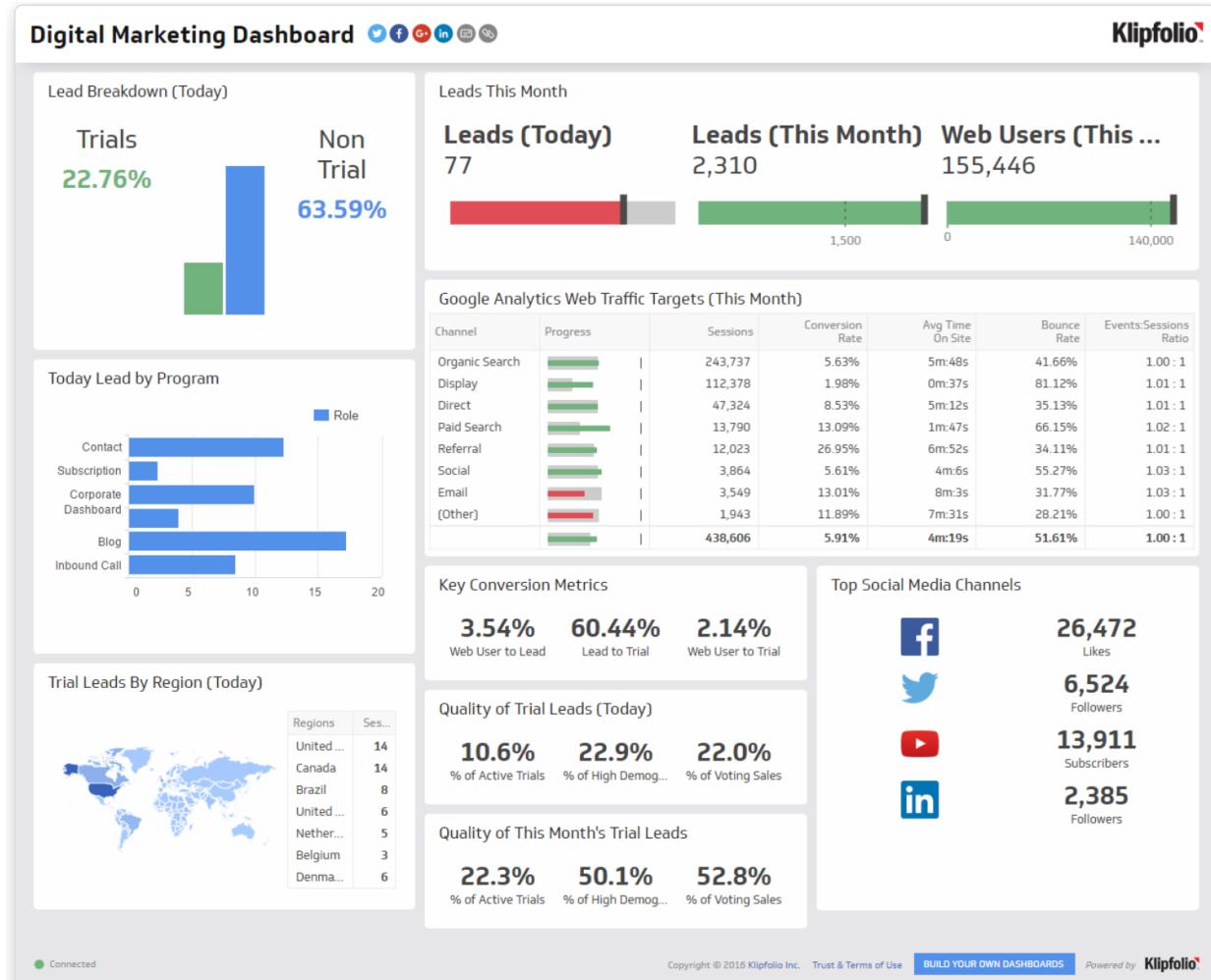


Exhibit 7.26: Example of Marketing Dashboard

Source: <https://www.klipfolio.com/resources/dashboard-examples/marketing/digital-marketing-dashboard>

### Progress Check

- Exhibit 7.26 presents an example of a digital marketing dashboard. If the company wanted to monitor the activities of potential customers on its website what KPIs should be added to the dashboard?

### (LEVEL 1 HEADER) SUMMARY

Marketing analytics is used to answer marketing questions. We specified the type of questions that can be addressed with both internal and external data across the 4 Ps of the marketing mix: product, price, place and promotion. Next, there was a discussion of the data available to address marketing questions. We also had a discussion of the different types of analytics that can be performed, including descriptive, diagnostic, predictive and prescriptive analytics. We concluded with an example of reporting the results using a marketing dashboard.

#### **(LEVEL 1 HEADER) KEY WORDS**

**brand** -is a phrase, symbol, logo, design or word that uniquely identifies a company.

**conversion rate** – percentage of potential customers that make a purchase.

**data lake** – a data repository with data stored in its natural form with no organization or hierarchy.

**key performance indicators (KPIs)** - numerical metrics that are used to gauge company performance.

**marketing** - the activity, set of institutions, and processes for creating, communicating, delivering, and exchanging offerings that have value for customers, clients, partners, and society at large.

**marketing analytics** - the processes and technologies that enable marketers to evaluate the success of their marketing initiatives.

**marketing channels** - final product distribution points.

**marketing dashboard** - a visual management tool that helps track and monitor KPIs in order to improve marketing effectiveness.

**marketing mix** - the key choices that a company makes to bring a product/service to market. It consists of product, price, place, and promotion (i.e., the 4Ps).

**OLAP (Online Analytical Processing) cube** – a data extract of compressed, multidimensional data for faster analytics processing (i.e., all possible combinations are pre-calculated because speed is the number one goal).

**place** - where a company sells a product and how the product will be delivered to the market.

**price** - the actual amount that a customer pays for a product. Setting price requires looking at the real costs to make and distribute the product, competitors' prices of like items (if any), and perceived value of a product.

**product** - the good or service that a company offers to customers.

**product life cycle** - the four phases (introduction, growth, maturity, and decline) that products go through from development to decline/market removal.

**promotion** - all of the marketing communication strategies and techniques used to convince customers that they need the product at the specified price. It includes advertising, public relations, sales promotions, and special offers.

**root cause analysis** - a process used to understand what is driving an (unexpected) change.

**social media analytics (SMA)** – the process of harvesting and analyzing social media websites.

**web analytics** – processes and technologies that extract and categorize quantitative and qualitative data from websites to identify and analyze patterns and trends.