

Business Case

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Table of contents I

- 1 Please Read Me
- 2 Purpose
- 3 Business Case
- 4 Acknowledgments

- This presentation is based on a business case taken from the course [Data Science for Business Part 1](#) offered by the company [Business Science](#) and adapted to be in line with the topics covered in ([Chapman and Feit 2019](#))

- Deliver essential knowledge within a minimal timeframe by employing hands-on learning techniques to enhance productivity in the R programming language

- You and your team will work for a corporation located in Wilton, Connecticut, United States that supplies bicycle frames and other components related to bicycles to different bicycle shops through the United States.
- Your team is assigned to complete 2 tasks:
 - Support the Research and Development (R & D) division in identifying potential new products and pricing them by using data collected from the bicycle shops.
 - Support the marketing team in the creation of a marketing segmentation clustering model by using data collected from the bicycle shops to offer more personalized products and messaging them.

- Business unit: Cannondale Bicycle Corporation (Manufacturer)
 - Location: USA
 - Product: Bicycle frames
 - Retailers: Bikesshops located through USA
 - We are not going to analyze the business-to-customer (B2B) subchannel (Retailer to Customer) where the focus will be on the business-to-business (B2B) subchannel (Manufacturer to Retailer)

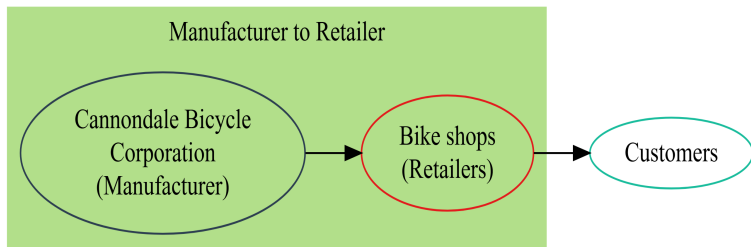


Figure 1: Distribution channel

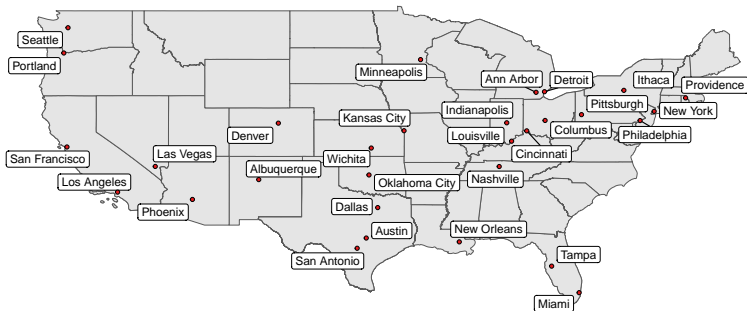


Figure 2: Bike shops locations

Cannondale Bikes

XXXXX, XXXXXXXXXXXX, XXXXX, XXXX

Phone: (XXX) XXX-XXXX

Fax: (XXX) XXX-XXXX

BILL TO:

XXXXXX XXXX

XXXXXXXXXXXXXXXXXX

XXX XXXXX XXXXX

XXXX, XXXX

(XXX) XXX-XXXX(123) 987-6543

COMMENTS OR SPECIAL INSTRUCTIONS:

XXXX XXXXXXXXXXXX XXXX

INVOICE

INVOICE # 1

DATE: 2011-01-07

SHIP TO:

XXXXXXXX XXXXX

Ithaca Mountain Climbers

XXX XXXX XXXXX

Ithaca, NY XXXX

(XXX) XXX-XXXX

SALESPERSON	P.O. NUMBER	REQUISITIONER	SHIPPED VIA	F.O.B. POINT	TERMS
XXXXX	XXX	XXXXX XXXX	Express air	Warehouse	Due on receipt

QUANTITY	DESCRIPTION	UNIT PRICE	TOTAL
1	Jekyll Carbon 2 - Over Mountain (Carbon)	6070	6070
1	Trigger Carbon 2 - Over Mountain (Carbon)	5970	5970
TOTAL DUE			12040

Make all checks payable to **Cannondale Bikes**

If you have any questions concerning this invoice, contact: XXXXX at (XXX) XXX-XXXX

THANK YOU FOR YOUR BUSINESS!

Figure 3: Invoice example representing a transaction

- **Entities**

- **Product**

- Product Id: unique product identification number
 - Model: model name of the bicycle
 - Category primary: main bicycle category (Mountain, Road)
 - Category secondary: More specific bicycle category (9 categories)
 - Frame: bicycle frame material (Carbon, Aluminum)

- **Retailer**

- Bike shop Id: unique bike shop identification number
 - Bike shop name
 - Bike shop state: state that the bike shop is located
 - Bike shop city: city that the bike shop is located
 - Latitude: geographic latitude of the bike shop location
 - Longitude: geographic longitude of the bike shop location

- Entities

- **Closed order**

- Order Id: unique order identification number
 - Order date: date the order was placed
 - Order line: sequential identification number for products on an order
 - Quantity: number of units purchased by the retailer
 - Price: unit price of the bicycle
 - Bike shop Id: unique bike shop identification number
 - Product Id: unique product identification number

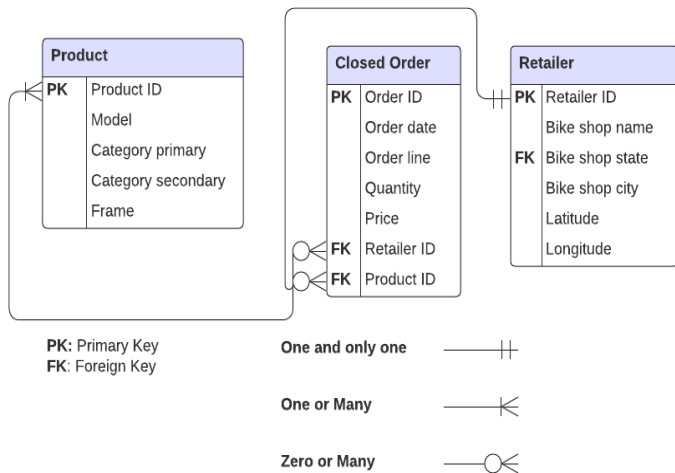


Figure 4: Database Entity Relationship Diagram (ERD)¹

¹See (Abba 2022)

• Understand the business data

```
library(tidyverse) # Remember to load the tidyverse library
library(sweep) # Remember to load the sweep library
```

```
bike_sales
```

```
# A tibble: 15,644 x 17
  order.date order.id order.line quantity price price.ext customer.id
  <date>      <dbl>      <int>    <dbl> <dbl>    <dbl>      <dbl>
1 2011-01-07         1         1      1 6070     6070         2
2 2011-01-07         1         2      1 5970     5970         2
3 2011-01-10         2         1      1 2770     2770        10
4 2011-01-10         2         2      1 5970     5970        10
5 2011-01-10         3         1      1 10660    10660         6
6 2011-01-10         3         2      1 3200     3200         6
7 2011-01-10         3         3      1 12790    12790         6
8 2011-01-10         3         4      1 5330     5330         6
9 2011-01-10         3         5      1 1570     1570         6
10 2011-01-11        4         1      1 4800     4800        22
# i 15,634 more rows
# i 10 more variables: bikeshop.name <chr>, bikeshop.city <chr>,
#   bikeshop.state <chr>, latitude <dbl>, longitude <dbl>, product.id <dbl>,
#   model <chr>, category.primary <chr>, category.secondary <chr>, frame <chr>
```

• Only works in RStudio IDE

```
bike_sales |> View()
```



- Products
 - 97 bicycle models

Table 1: First 5 products

Product Id	Model	Primary category	Secondary category	Frame
48	Jekyll Carbon 2	Mountain	Over Mountain	Carbon
52	Trigger Carbon 2	Mountain	Over Mountain	Carbon
76	Beast of the East 1	Mountain	Trail	Aluminum
2	Supersix Evo Hi-Mod Team	Road	Elite Road	Carbon
50	Jekyll Carbon 4	Mountain	Over Mountain	Carbon

- Retailers
 - 30 bike shops

Table 2: First 5 retailers

Retailer Id	Bike shop name	City	State	Latitude	Longitude
2	Ithaca Mountain Climbers	Ithaca	NY	42.44396	-76.50188
10	Kansas City 29ers	Kansas City	KS	39.11405	-94.62746
6	Louisville Race Equipment	Louisville	KY	38.25267	-85.75846
22	Ann Arbor Speed	Ann Arbor	MI	42.28083	-83.74304
8	Denver Bike Shop	Denver	CO	39.73924	-104.99025

- Closed orders
 - 2000 orders

Table 3: First 5 orders

Order date	Order Id	Order line	Quantity	Price	Retailer Id	Product Id
2011-01-07	1	1	1	6070	2	48
2011-01-07	1	2	1	5970	2	52
2011-01-10	2	1	1	2770	10	76
2011-01-10	2	2	1	5970	10	52
2011-01-10	3	1	1	10660	6	2
2011-01-10	3	2	1	3200	6	50
2011-01-10	3	3	1	12790	6	1
2011-01-10	3	4	1	5330	6	4
2011-01-10	3	5	1	1570	6	34
2011-01-11	4	1	1	4800	22	26
2011-01-11	5	1	1	480	8	96
2011-01-11	5	2	8	11190	8	66
2011-01-11	5	3	1	1250	8	35
2011-01-11	5	4	1	2060	8	72

- To my family that supports me
- To the taxpayers of Colombia and the **UMNG students** who pay my salary
- To the **Business Science** and **R4DS Online Learning** communities where I learn **R** and **π -thon**
- To the **R Core Team**, the creators of **RStudio IDE**, **Quarto** and the authors and maintainers of the packages **tidyverse**, **tigris**, **janitor**, **sweep**, **kableExtra** and **tinytex** for allowing me to access these tools without paying for a license
- To the **Linux kernel community** for allowing me the possibility to use some **Linux distributions** as my main **OS** without paying for a license

References I

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<https://www.freecodecamp.org/news/crows-foot-notation-relationship-symbols-and-how-to-read-diagrams/>.
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<https://doi-org.ezproxy.umng.edu.co/10.1007/978-3-030-14316-9>.