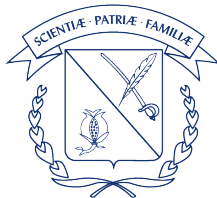


# Business Case

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FAEDIS

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UNIVERSIDAD MILITAR  
NUEVA GRANADA

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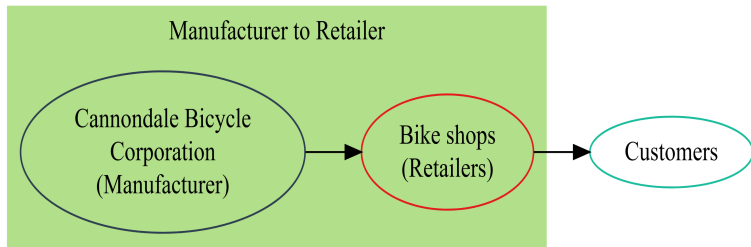
- 1 Please Read Me
- 2 Purpose
- 3 Business Case
- 4 Acknowledgments

- 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 [\(Chapman and Feit 2019\)](#)

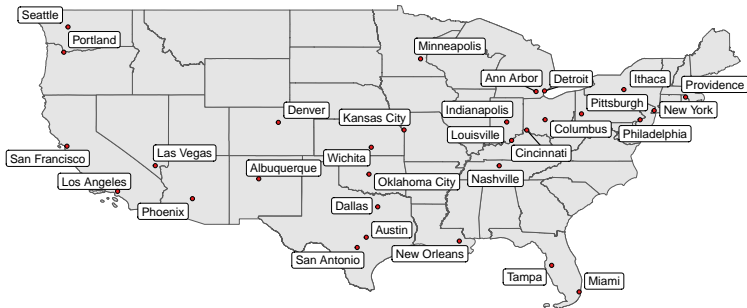
- Deliver essential knowledge within a minimal timeframe by employing hands-on learning techniques to enhance productivity in the R programming language

- 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 (B2C) 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  
 XXXXXX XXXXXXXXXXXX  
 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:

XXXXXX 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)

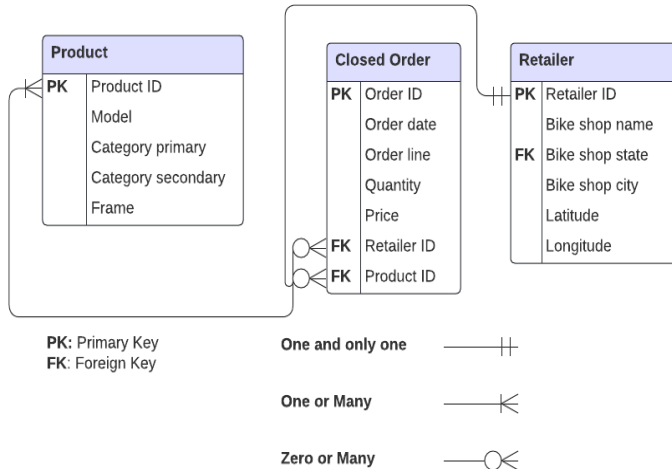
- **Retailer**

- 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)<sup>1</sup>

<sup>1</sup>See (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 <date>	order.id <dbl>	order.line <int>	quantity <dbl>	price <dbl>	price.ext <dbl>	customer.id <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  **$\pi$ -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

- Abba, Ihechikara Vincent. 2022. "Crow's Foot Notation – Relationship Symbols And How to Read Diagrams."  
<https://www.freecodecamp.org/news/crows-foot-notation-relationship-symbols-and-how-to-read-diagrams/>.
- Chapman, Chris, and Elea McDonnell Feit. 2019. *R For Marketing Research and Analytics*. 2nd ed. 2019. Use R! Cham: Springer International Publishing : Imprint: Springer.  
<https://doi-org.ezproxy.umng.edu.co/10.1007/978-3-030-14316-9>.