

KOLEGIJ: SUSTAVI POSLOVNE INTELIGENCIJE

STUDENT: KRISTINA ŠTEFANAC

Bike Sales

Sadržaj

- ❑ Prikaz podatka
- ❑ Relacijski model i punjenje baze podatka
- ❑ Dimenzijski model i punjenje skladišta podatka
- ❑ Analiza i vizualizacija podatka

Prikaz podatka

Prikaz podataka

❑ Podaci su preuzeti preko

linka: <https://www.kaggle.com/datasets/sadiqshah/bike-sales-in-europe/code>

❑ Podaci prikazuju skup podataka vezan uz prodaju bicikala i opreme za iste u periodu od 2011.do 2016.

	Date	Day	Month	Year	Customer_Age	Age_Group	Customer_Gender	Country	State	Product_Category	Sub_Category	Product	Order_Quantity	Unit_Cost	Unit_Price	Profit	Cost	Revenue
0	2013-11-26	26	November	2013	19	Youth (<25)	M	Canada	British Columbia	Accessories	Bike Racks	Hitch Rack - 4-Bike	8	45	120	590	360	950
1	2015-11-26	26	November	2015	19	Youth (<25)	M	Canada	British Columbia	Accessories	Bike Racks	Hitch Rack - 4-Bike	8	45	120	590	360	950
2	2014-03-23	23	March	2014	49	Adults (35-64)	M	Australia	New South Wales	Accessories	Bike Racks	Hitch Rack - 4-Bike	23	45	120	1366	1035	2401
3	2016-03-23	23	March	2016	49	Adults (35-64)	M	Australia	New South Wales	Accessories	Bike Racks	Hitch Rack - 4-Bike	20	45	120	1188	900	2088
4	2014-05-15	15	May	2014	47	Adults (35-64)	F	Australia	New South Wales	Accessories	Bike Racks	Hitch Rack - 4-Bike	4	45	120	238	180	418

Prikaz podatka

Veličina skupa

```
[ ] df.shape
```

```
(113036, 18)
```

Stupci

```
df.columns
```

```
In[ ]: Index(['Date', 'Day', 'Month', 'Year', 'Customer_Age', 'Age_Group',  
            'Customer_Gender', 'Country', 'State', 'Product_Category',  
            'Sub_Category', 'Product', 'Order_Quantity', 'Unit_Cost', 'Unit_Price',  
            'Profit', 'Cost', 'Revenue'],  
           dtype='object')
```

Nedostojeće vrijednosti

```
[ ] df.isna().sum()
```

Date	0
Day	0
Month	0
Year	0
Customer_Age	0
Age_Group	0
Customer_Gender	0
Country	0
State	0
Product_Category	0
Sub_Category	0
Product	0
Order_Quantity	0
Unit_Cost	0
Unit_Price	0
Profit	0
Cost	0
Revenue	0
dtype:	int64

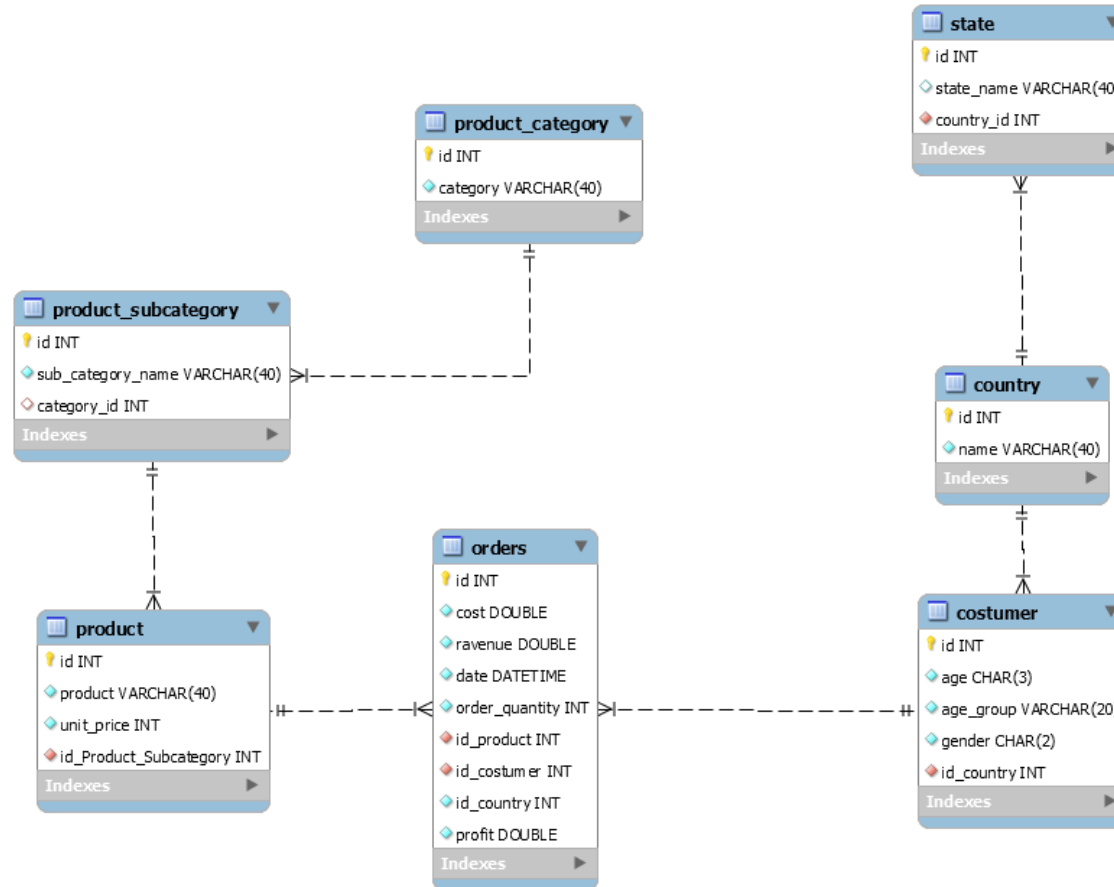
Jedinstvene vrijednosti

```
[ ] df.nunique()
```

Date	1884
Day	31
Month	12
Year	6
Customer_Age	70
Age_Group	4
Customer_Gender	2
Country	6
State	53
Product_Category	3
Sub_Category	17
Product	130
Order_Quantity	32
Unit_Cost	34
Unit_Price	36
Profit	1256
Cost	360
Revenue	1876
dtype:	int64

Relacijski model i punjenje baze podataka

Relacijski model



- ```
CREATE TABLE IF NOT EXISTS Country (
 id INTEGER NOT NULL AUTO_INCREMENT,
 name VARCHAR(40) NOT NULL,
 PRIMARY KEY(id),
 UNIQUE (name)
);
```
- ```
CREATE TABLE IF NOT EXISTS State (
  id INTEGER NOT NULL AUTO_INCREMENT,
  state_name VARCHAR(40) DEFAULT NULL,
  country_id INTEGER NOT NULL,
  PRIMARY KEY (id),
  UNIQUE (state_name),
  FOREIGN KEY (country_id) REFERENCES Country(id)
);
```

id	name
2	Australia
1	Canada
7	France
6	Germany
10	United Kingdom
4	United States
NULL	NULL

id	state_name	country_id
1	British Columbia	1
2	New South Wales	2
4	Oregon	4
6	Saarland	6
7	Seine Saint Denis	7
10	England	10
NULL	NULL	NULL

Punjenje baze podataka


```

CREATE TABLE IF NOT EXISTS Product_Category (
  id INTEGER NOT NULL AUTO_INCREMENT,
  category VARCHAR(40) NOT NULL,
  UNIQUE(category),
  PRIMARY KEY (id)
);

```

id	category
1	Accessories
11	Bikes
4	Clothing
NULL	NULL

```

CREATE TABLE IF NOT EXISTS Product_Subcategory (
  id INTEGER NOT NULL AUTO_INCREMENT,
  sub_category_name VARCHAR(40) NOT NULL,
  category_id INT,
  FOREIGN KEY(category_id) REFERENCES Product_Category(id),
  PRIMARY KEY (id)
);

```

id	sub_category_name	category_id
1	Bike Racks	1
2	Bike Stands	1
3	Bottles and Cages	1
4	Caps	4
5	Cleaners	1
6	Fenders	1
7	Gloves	4
8	Helmets	1
9	Hydration Packs	1
10	Jerseys	4

Punjenje baze podatka

- ```
CREATE TABLE IF NOT EXISTS Product (
 id INTEGER NOT NULL AUTO_INCREMENT,
 product VARCHAR(40) NOT NULL,
 unit_price INTEGER NOT NULL,
 PRIMARY KEY (id),
 UNIQUE (product,unit_price),
 id_Product_Subcategory INTEGER NOT NULL,
 FOREIGN KEY(id_product_subcategory) REFERENCES Product_Subcategory (id)
);
```

|     | Product                 | Unit_Price | product_subcategory_id |
|-----|-------------------------|------------|------------------------|
| 1   | Hitch Rack - 4-Bike     | 120        | 1                      |
| 2   | All-Purpose Bike Stand  | 159        | 1                      |
| 3   | Mountain Bottle Cage    | 10         | 2                      |
| 4   | Water Bottle - 30 oz.   | 5          | 2                      |
| 5   | Road Bottle Cage        | 9          | 2                      |
| ... | ...                     | ...        | ...                    |
| 133 | Touring-2000 Blue, 60   | 1215       | 15                     |
| 134 | Touring-1000 Yellow, 50 | 2384       | 16                     |
| 135 | Classic Vest, L         | 64         | 16                     |
| 136 | Classic Vest, M         | 64         | 16                     |
| 137 | Classic Vest, S         | 64         | 16                     |

Punjenje baze podatka

# Punjenje baze

```
• CREATE TABLE IF NOT EXISTS Costumer (
 id INTEGER NOT NULL AUTO_INCREMENT,
 age CHAR(3) NOT NULL,
 age_group VARCHAR (20) NOT NULL,
 gender CHAR(2) NOT NULL,
 UNIQUE (age_group, gender),
 PRIMARY KEY (id),
 id_country INTEGER NOT NULL,
 FOREIGN KEY (id_country) REFERENCES Country(id)
);
```

|   | Customer_Age | Age_Group            | Customer_Gender | country_id | Country   | State            | customer_id |
|---|--------------|----------------------|-----------------|------------|-----------|------------------|-------------|
| 1 | 49           | Adults (35-64)       | M               | 1          | Canada    | British Columbia | 1           |
| 2 | 47           | Adults (35-64)       | F               | 1          | Canada    | British Columbia | 2           |
| 3 | 47           | Adults (35-64)       | F               | 2          | Australia | New South Wales  | 3           |
| 4 | 35           | Adults (35-64)       | M               | 2          | Australia | New South Wales  | 4           |
| 5 | 32           | Young Adults (25-34) | F               | 2          | Australia | New South Wales  | 5           |

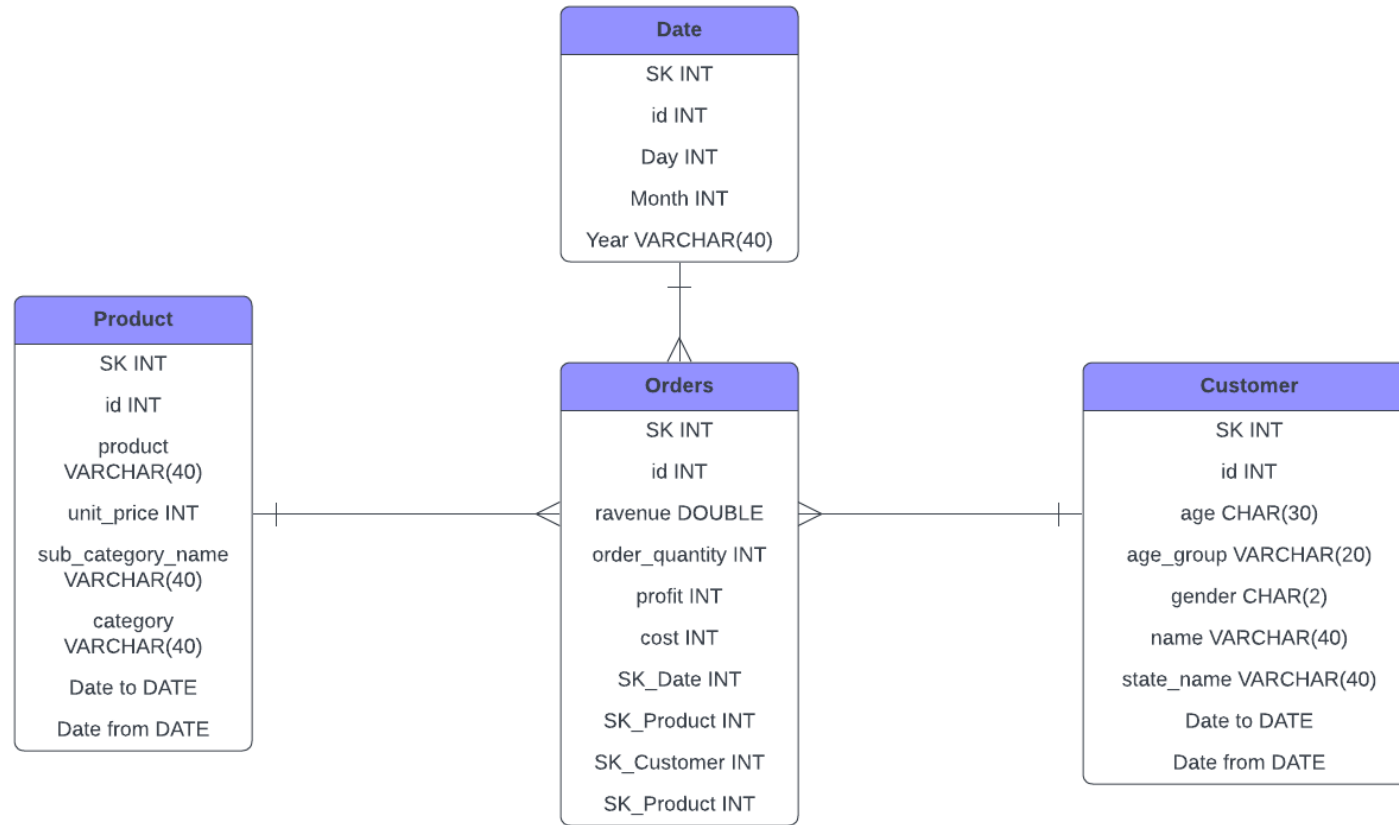
# Punjenje baze podatka

```
• CREATE TABLE IF NOT EXISTS Orders (
 id INTEGER NOT NULL AUTO_INCREMENT,
 cost DOUBLE NOT NULL,
 revenue DOUBLE NOT NULL,
 date DATETIME NOT NULL,
 order_quantity INTEGER NOT NULL,
 id_product INTEGER NOT NULL,
 id_costumer INTEGER NOT NULL,
 id_country INTEGER NOT NULL,
 profit DOUBLE NOT NULL,
 PRIMARY KEY (id),
 FOREIGN KEY (id_product) REFERENCES Product(id),
 FOREIGN KEY (id_costumer) REFERENCES Costumer(id)
);
```

|        | Date       | Product_Category | Sub_Category | Product             | Order_Quantity | Unit_Price | Profit | Cost | Revenue | customer_id |
|--------|------------|------------------|--------------|---------------------|----------------|------------|--------|------|---------|-------------|
| 2      | 2014-03-23 | Accessories      | Bike Racks   | Hitch Rack - 4-Bike | 23             | 120        | 1366   | 1035 | 2401    | 1           |
| 3      | 2016-03-23 | Accessories      | Bike Racks   | Hitch Rack - 4-Bike | 20             | 120        | 1188   | 900  | 2088    | 1           |
| 4      | 2014-05-15 | Accessories      | Bike Racks   | Hitch Rack - 4-Bike | 4              | 120        | 238    | 180  | 418     | 2           |
| 5      | 2016-05-15 | Accessories      | Bike Racks   | Hitch Rack - 4-Bike | 5              | 120        | 297    | 225  | 522     | 2           |
| 6      | 2014-05-22 | Accessories      | Bike Racks   | Hitch Rack - 4-Bike | 4              | 120        | 199    | 180  | 379     | 3           |
| ...    | ...        | ...              | ...          | ...                 | ...            | ...        | ...    | ...  | ...     | ...         |
| 113031 | 2016-04-12 | Clothing         | Vests        | Classic Vest, S     | 3              | 64         | 112    | 72   | 184     | 743         |
| 113032 | 2014-04-02 | Clothing         | Vests        | Classic Vest, M     | 22             | 64         | 655    | 528  | 1183    | 1347        |
| 113033 | 2016-04-02 | Clothing         | Vests        | Classic Vest, M     | 22             | 64         | 655    | 528  | 1183    | 1347        |
| 113034 | 2014-03-04 | Clothing         | Vests        | Classic Vest, L     | 24             | 64         | 684    | 576  | 1260    | 1295        |
| 113035 | 2016-03-04 | Clothing         | Vests        | Classic Vest, L     | 23             | 64         | 655    | 552  | 1207    | 1295        |

# Dimenzijski model i punjenje skladišta podatka

# Dimenzijski model



# Punjenje skladišta podataka

|      | Customer_Age | Age_Group            | Customer_Gender | country_id | Country_x | State_x          | dim_customer_id | date_from  | date_to | Country_y | State_y          |
|------|--------------|----------------------|-----------------|------------|-----------|------------------|-----------------|------------|---------|-----------|------------------|
| 1    | 49           | Adults (35-64)       | M               | 1          | Canada    | British Columbia | 1               | 2023-06-01 | NaT     | Canada    | British Columbia |
| 2    | 47           | Adults (35-64)       | F               | 1          | Canada    | British Columbia | 2               | 2023-06-01 | NaT     | Canada    | British Columbia |
| 3    | 47           | Adults (35-64)       | F               | 2          | Australia | New South Wales  | 3               | 2023-06-01 | NaT     | Australia | New South Wales  |
| 4    | 35           | Adults (35-64)       | M               | 2          | Australia | New South Wales  | 4               | 2023-06-01 | NaT     | Australia | New South Wales  |
| 5    | 32           | Young Adults (25-34) | F               | 2          | Australia | New South Wales  | 5               | 2023-06-01 | NaT     | Australia | New South Wales  |
| ...  | ...          | ...                  | ...             | ...        | ...       | ...              | ...             | ...        | ...     | ...       | ...              |
| 2157 | 35           | Adults (35-64)       | F               | 32         | Canada    | British Columbia | 2157            | 2023-06-01 | NaT     | Canada    | British Columbia |
| 2158 | 63           | Adults (35-64)       | M               | 13         | Australia | Victoria         | 2158            | 2023-06-01 | NaT     | Australia | Victoria         |
| 2159 | 60           | Adults (35-64)       | F               | 13         | Australia | Victoria         | 2159            | 2023-06-01 | NaT     | Australia | Victoria         |
| 2160 | 59           | Adults (35-64)       | F               | 10         | Australia | Victoria         | 2160            | 2023-06-01 | NaT     | Australia | Victoria         |
| 2161 | 55           | Adults (35-64)       | M               | 17         | Canada    | British Columbia | 2161            | 2023-06-01 | NaT     | Canada    | British Columbia |

Customer

# Punjenje skladišta podataka

|        | date       | dim_date_id | day | month    | year | day_of_week | month_name | quarter |
|--------|------------|-------------|-----|----------|------|-------------|------------|---------|
| 1      | 2015-11-26 | 1           | 26  | November | 2015 | Thursday    | November   | 4       |
| 2      | 2014-03-23 | 2           | 23  | March    | 2014 | Sunday      | March      | 1       |
| 3      | 2016-03-23 | 3           | 23  | March    | 2016 | Wednesday   | March      | 1       |
| 4      | 2014-05-15 | 4           | 15  | May      | 2014 | Thursday    | May        | 2       |
| 5      | 2016-05-15 | 5           | 15  | May      | 2016 | Sunday      | May        | 2       |
| ...    | ...        | ...         | ... | ...      | ...  | ...         | ...        | ...     |
| 113031 | 2016-04-12 | 113031      | 12  | April    | 2016 | Tuesday     | April      | 2       |
| 113032 | 2014-04-02 | 113032      | 2   | April    | 2014 | Wednesday   | April      | 2       |
| 113033 | 2016-04-02 | 113033      | 2   | April    | 2016 | Saturday    | April      | 2       |
| 113034 | 2014-03-04 | 113034      | 4   | March    | 2014 | Tuesday     | March      | 1       |
| 113035 | 2016-03-04 | 113035      | 4   | March    | 2016 | Friday      | March      | 1       |

Date



# Punjenje skladišta podataka

|     | Product                 | Unit_Price | product_subcategory_id | Product_Category | Sub_Category      | dim_product_id | date_from  | date_to |
|-----|-------------------------|------------|------------------------|------------------|-------------------|----------------|------------|---------|
| 1   | Hitch Rack - 4-Bike     | 120        | 1                      | Accessories      | Bike Stands       | 1              | 2023-06-01 | NaT     |
| 2   | All-Purpose Bike Stand  | 159        | 1                      | Accessories      | Bike Stands       | 2              | 2023-06-01 | NaT     |
| 3   | Mountain Bottle Cage    | 10         | 2                      | Accessories      | Bottles and Cages | 3              | 2023-06-01 | NaT     |
| 4   | Water Bottle - 30 oz.   | 5          | 2                      | Accessories      | Bottles and Cages | 4              | 2023-06-01 | NaT     |
| 5   | Road Bottle Cage        | 9          | 2                      | Accessories      | Bottles and Cages | 5              | 2023-06-01 | NaT     |
| ... | ...                     | ...        | ...                    | ...              | ...               | ...            | ...        | ...     |
| 133 | Touring-2000 Blue, 60   | 1215       | 15                     | Bikes            | Touring Bikes     | 133            | 2023-06-01 | NaT     |
| 134 | Touring-1000 Yellow, 50 | 2384       | 16                     | Clothing         | Vests             | 134            | 2023-06-01 | NaT     |
| 135 | Classic Vest, L         | 64         | 16                     | Clothing         | Vests             | 135            | 2023-06-01 | NaT     |
| 136 | Classic Vest, M         | 64         | 16                     | Clothing         | Vests             | 136            | 2023-06-01 | NaT     |
| 137 | Classic Vest, S         | 64         | 16                     | Clothing         | Vests             | 137            | 2023-06-01 | NaT     |

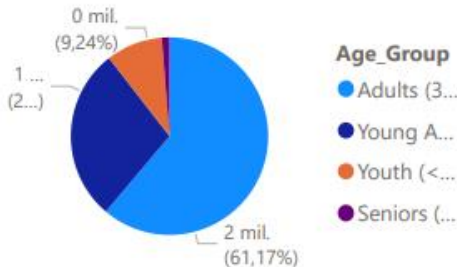
Product

# *Analiza i vizualizacija podataka*

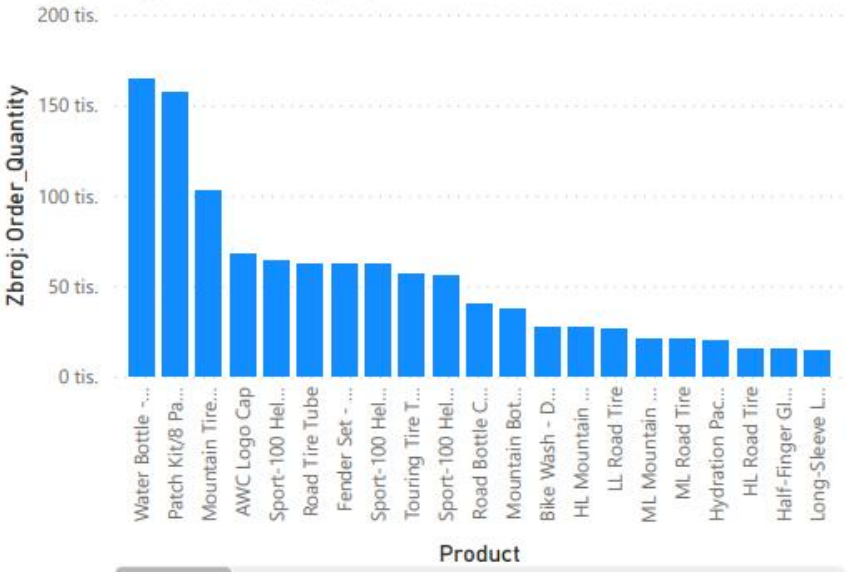
# Sales Report

1 mil.

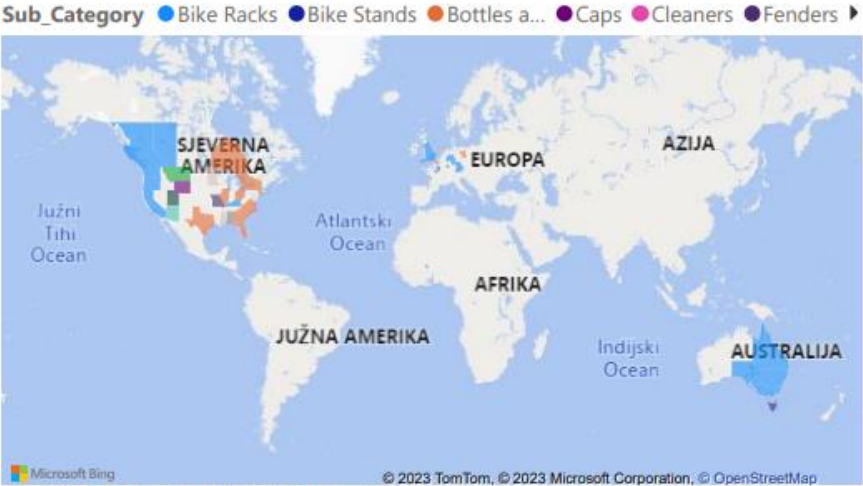
Zbroj: Customer\_Age kategorije  
Age\_Group



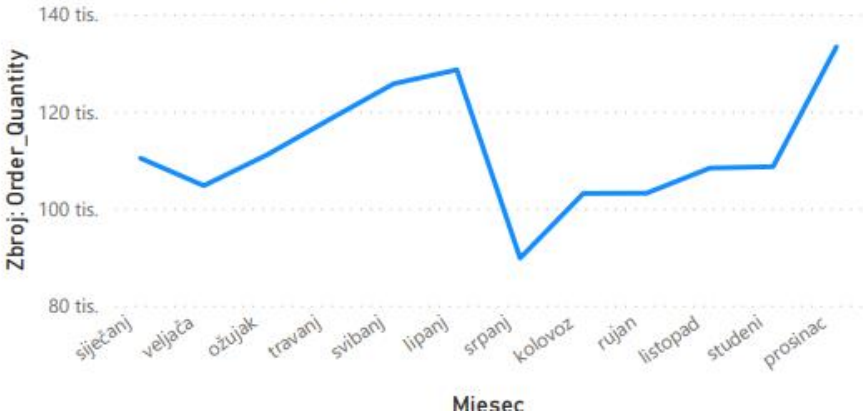
Zbroj: Order\_Quantity kategorije Product



State i Sub\_Category

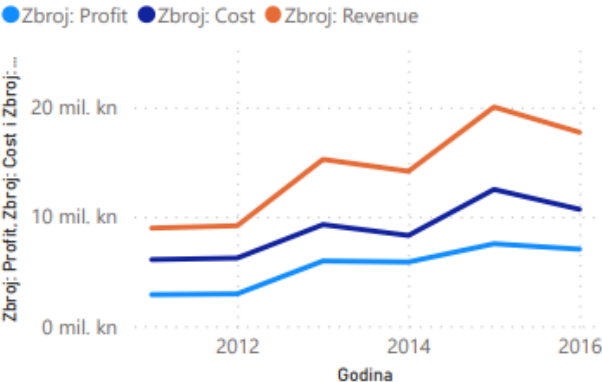


Zbroj: Order\_Quantity kategorije Mjesec



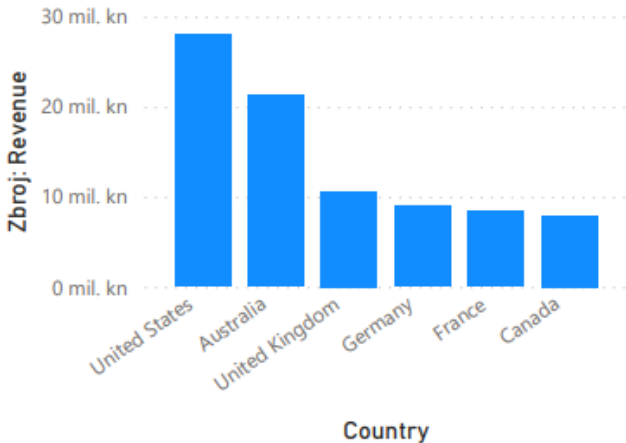
# Sales Report

Zbroj: Profit, Zbroj: Cost i Zbroj: Revenue kategorije Godina

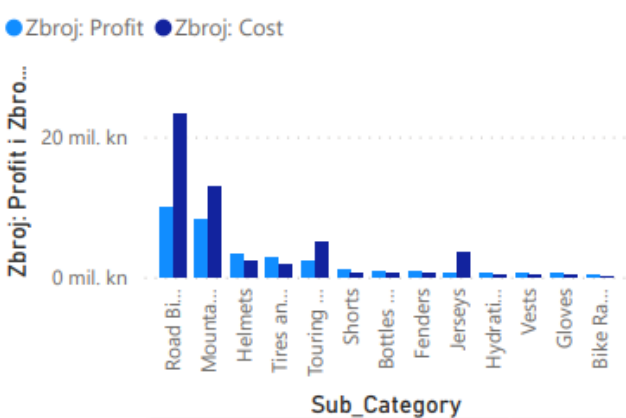


| Mjesec        | Zbroj: Profit        | Profit po godinama (%) 2 |
|---------------|----------------------|--------------------------|
| siječanj      | 2.618.521 kn         | 62,49 %                  |
| veljača       | 2.562.322 kn         | 60,37 %                  |
| ožujak        | 2.761.866 kn         | 60,08 %                  |
| travanj       | 2.864.719 kn         | 62,08 %                  |
| svibanj       | 3.326.937 kn         | 63,10 %                  |
| lipanj        | 3.383.583 kn         | 69,61 %                  |
| srpanj        | 2.139.750 kn         | 13,51 %                  |
| kolovoz       | 2.214.204 kn         | 0,00 %                   |
| rujan         | 2.249.661 kn         | 0,00 %                   |
| listopad      | 2.301.312 kn         | 0,00 %                   |
| studen        | 2.388.513 kn         | 0,00 %                   |
| <b>Ukupno</b> | <b>32.221.100 kn</b> | <b>27,94 %</b>           |

Zbroj: Revenue kategorije Country



Zbroj: Profit i Zbroj: Cost kategorije Sub\_Category



53,049908...  
mil.kn

Zbroj: Cost

85,271007...  
mil.kn

Zbroj: Revenue

32,2211000...  
mil.kn

Zbroj: Profit