# 2Market Technical Report

By: Charles Garrod

**Problem Statement**

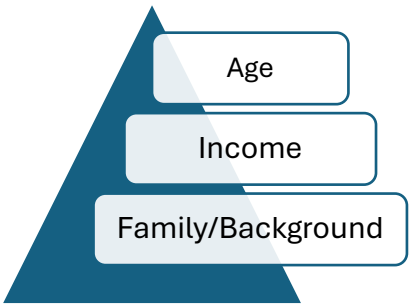
2Market is a global supermarket. The problem of customer demographics, advertising channels and sales affect the marketing, sales and procurement departments. Lack of a firm understanding of what drives these factors will result in ineffective marketing and product offerings.

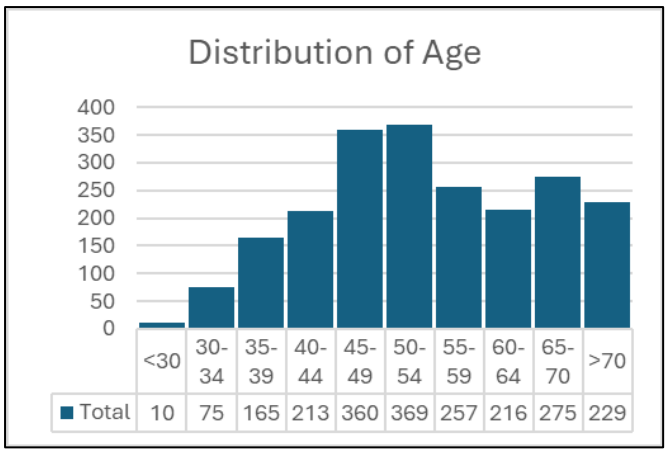
The impact of this is an expensive yet ineffective marketing campaign pushing undesirable products. A successful solution to this issue is to create a dashboard detailing the demographics of 2Market's customers, the products they purchase and the most successful marketing channels and any trends in this data. This will allow 2Market to efficiently deploy capital to effective marketing campaigns for popular or increasingly popular products.

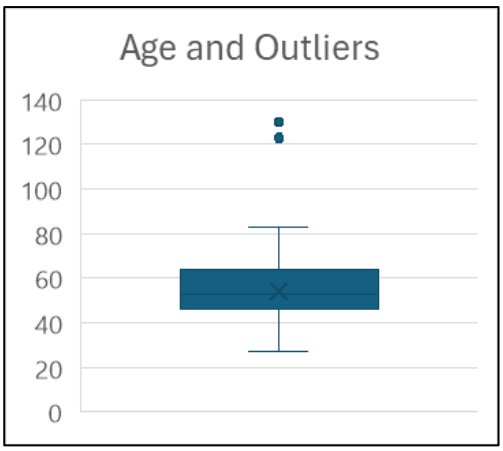
**Analytical Approach**

The aim of the data analysis is to gather actionable insights into 2Market's customers, namely demographics and purchasing behaviour. This will facilitate data led decision making with regards future marketing campaigns and avenues and will be presented through clear, concise dashboards and in-depth recommendations.

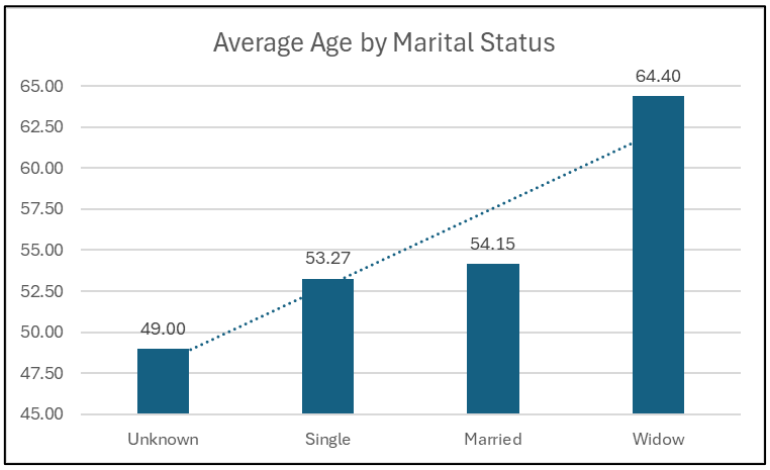
Excel was used for initial visualisations focused on demographics. Further details on the tools used and the data cleaning process are contained in the appendix.  The following three categories were used to focus the demographic visualisations.



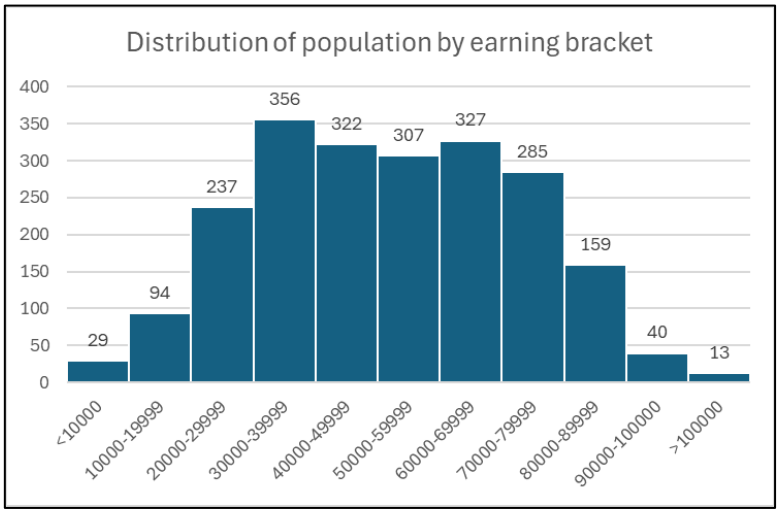


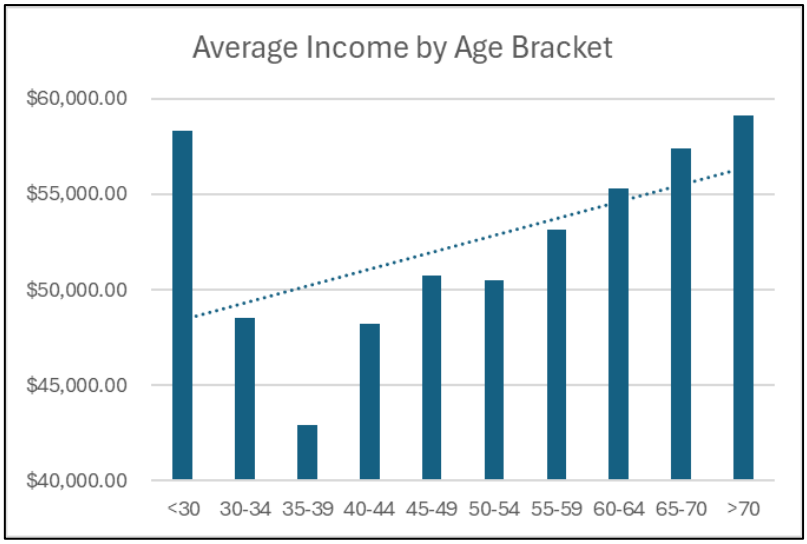

As seen in the above, most of the population is in the 50-54 age bracket and 62% of the population are above the age of 50. The average age is 54.




As one would expect, the average age of the population is the highest for those who have been widowed, with a clear trend in the average age.

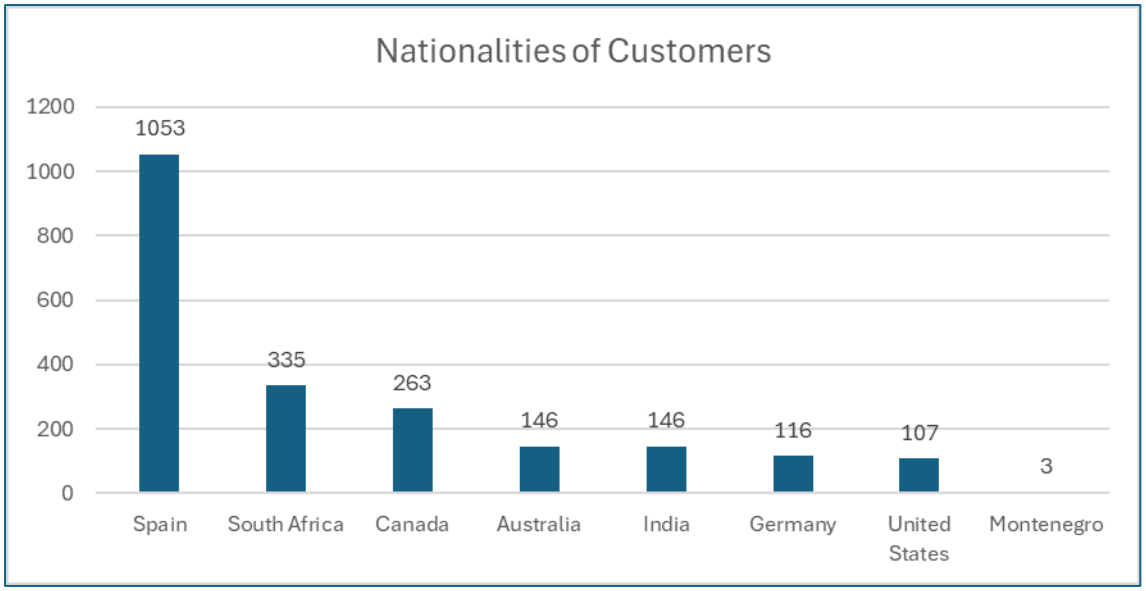



As seen in the above, most of the population earn between $30,000 & $40,000 with 67% of the population earning over $30,000.

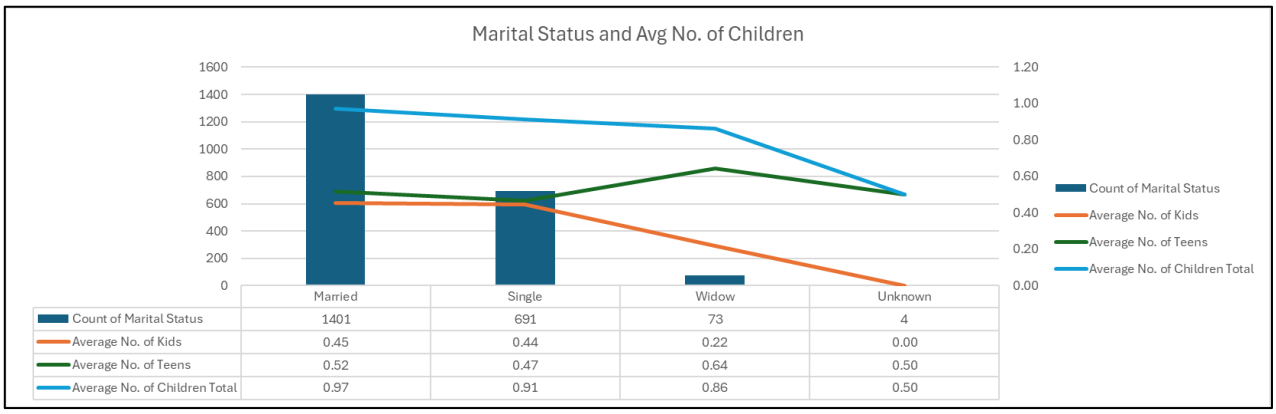



There is a clear trend in the income data with regards to age. As age increases so does income, with those over age 70 earning the most on average. What's intriguing, and perhaps requires further investigation, is the anomalous level of income for the under 30 age bracket.

Of the countries represented by 2Market's customers, Spain has the largest population with almost 50% of customers residing in Spain.

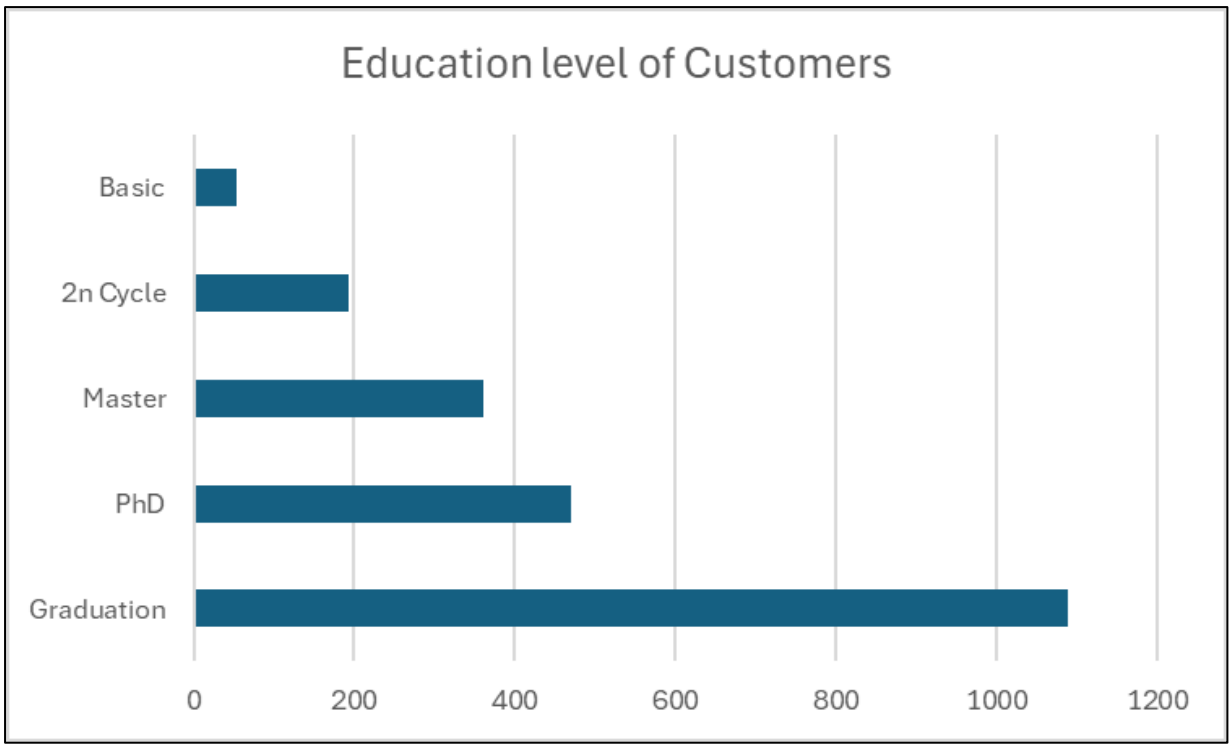


Almost 72% of customers have at least one child, with 20% of customers having 2 or more children. Married customers make up 65% of the population and, as one might expect, have the greatest number of children on average.




| | Married | Single | Widow | Unknown |
|---|---|---|---|---|
| Count of Marital Status | 1401 | 691 | 73 | 4 |
| Average No. of Kids | 0.45 | 0.44 | 0.22 | 0.00 |
| Average No. of Teens | 0.52 | 0.47 | 0.64 | 0.50 |
| Average No. of Children Total | 0.97 | 0.91 | 0.86 | 0.50 |

Finally, most customers are educated to at least Graduate level with 50% having studied an undergraduate course.



SQL was then used to further probe the sales and marketing data. In the below, we can see that Spain has the greatest total spend, however this is expected considering it accounts for almost 50% of the population. On a per capita basis, Montenegro has the highest spend.

| | country<br>character varying (50) | total_spend<br>bigint | total_spend_per_capita<br>bigint |
|---|---|---|---|
| 1 | Montenegro | 3122 | 1040 |
| 2 | Canada | 167077 | 635 |
| 3 | United States of America | 67546 | 631 |
| 4 | Germany | 73198 | 631 |
| 5 | South Africa | 209345 | 624 |
| 6 | Spain | 636151 | 604 |
| 7 | Australia | 84970 | 581 |
| 8 | India | 76572 | 524 |

Alcohol was, the most popular product across all geographies, followed by the non-vegetable products.

| | country<br>character varying (50) | alcohol<br>bigint | vegetables<br>bigint | non_vegetable_products<br>bigint | fish<br>bigint | chocolate<br>bigint | commodities<br>bigint | total_sales<br>bigint |
|---|---|---|---|---|---|---|---|---|
| 1 | Spain | 324299 | 27108 | 172348 | 38416 | 29069 | 44911 | 636151 |
| 2 | South Africa | 105034 | 8887 | 57982 | 13628 | 8921 | 14893 | 209345 |
| 3 | Canada | 83893 | 7678 | 45855 | 9963 | 7592 | 12096 | 167077 |
| 4 | Australia | 42424 | 3680 | 22204 | 5534 | 4105 | 7023 | 84970 |
| 5 | India | 35904 | 3594 | 23352 | 4669 | 3096 | 5957 | 76572 |
| 6 | Germany | 36776 | 2980 | 20272 | 4601 | 2801 | 5768 | 73198 |
| 7 | United States of America | 32214 | 3034 | 20185 | 4411 | 2863 | 4839 | 67546 |
| 8 | Montenegro | 1729 | 8 | 817 | 226 | 122 | 220 | 3122 |

Couples are the biggest spenders; however, it is couples with no children that spend the most amongst this group. This suggests that the number of children in the home doesn't necessarily correlate with level of expenditure.

To evaluate the success of different marketing channels, the ad data table was joined to the marketing data table and lead conversion used as a measure of the effectiveness of each channel. Social media channels were, generally, the most successful forms of media across geographies and marital statuses.

| | country character varying (50) | social_media bigint | traditional_promotions bigint |
|---|---|---|---|
| 1 | United States of America | 18 | 8 |
| 2 | Spain | 246 | 95 |
| 3 | South Africa | 61 | 25 |
| 4 | Montenegro | 0 | 1 |
| 5 | Australia | 25 | 9 |
| 6 | Germany | 26 | 12 |
| 7 | Canada | 63 | 23 |
| 8 | India | 23 | 15 |

| | country character varying (50) | twitter bigint | instagram bigint | facebook bigint |
|---|---|---|---|---|
| 1 | United States of America | 6 | 5 | 7 |
| 2 | Spain | 85 | 87 | 74 |
| 3 | South Africa | 20 | 21 | 20 |
| 4 | Montenegro | 0 | 0 | 0 |
| 5 | Australia | 6 | 12 | 7 |
| 6 | Germany | 11 | 8 | 7 |
| 7 | Canada | 24 | 21 | 18 |
| 8 | India | 10 | 6 | 7 |

Further analysis was conducted to show which social media platform was most effective in generating sales based on customer spend and their percentage attribution to total expenditure.

| | country character varying (50) | total_insta bigint | total_twitter bigint | total_facebook bigint | total_bulkmail bigint | total_brochure bigint | total_all_channels numeric | percent_of_spend numeric | total_spend bigint |
|---|---|---|---|---|---|---|---|---|---|
| 1 | Spain | 144397 | 99081 | 111175 | 51810 | 20626 | 427089 | 67 | 636151 |
| 2 | South Africa | 35738 | 26748 | 31211 | 13287 | 4282 | 111266 | 53 | 209345 |
| 3 | Canada | 30954 | 25261 | 27650 | 16199 | 6397 | 106461 | 64 | 167077 |
| 4 | Australia | 18505 | 7915 | 10480 | 9866 | 0 | 46766 | 55 | 84970 |
| 5 | India | 9444 | 8129 | 8963 | 9779 | 3736 | 40051 | 52 | 76572 |
| 6 | Germany | 12551 | 11538 | 9649 | 7949 | 3007 | 44694 | 61 | 73198 |
| 7 | United States of America | 7048 | 4698 | 8806 | 3986 | 0 | 24538 | 36 | 67546 |
| 8 | Montenegro | 0 | 0 | 0 | 874 | 0 | 874 | 28 | 3122 |

**Dashboard Design**

Given the project spec, the dashboard focuses on 3 key areas: demographics, spending behaviour and advertising channels.

The rationale behind the dashboard design was simple, deliver useful, decision critical insights that are easy to understand. It uses simple, yet eye catching colour schemes which allow stakeholder to follow and work with the visualisations without difficulty. The visualisations were kept as user friendly as possible with consideration given to how they might be viewed. The maps on each start as the main focal point and as such are in the same position, allowing stakeholders to dive into each country's data immediately, acting as the primary filter for each dashboard.

**Patterns, trends, and insights**

Spain is the most successful location across all KPIs, generating the greatest revenue, the greatest number of customers and most successful advertising strategy. 2Market should use Spain as the model for its other locations.

The most popular product across the population is alcohol followed closely by non-vegetable products (meat, pizzas, ready meals etc.). 2Market would be smart to offer meal deals that contain both a non-vegetable based main with alcohol. However, a blanket deal may not be wise - while married couples are the best customers, it is married couples with no children that spend the most across 2Market. It would be optimal to focus the meal deals on meals for two adults and offering child options separately. Considering seasonal sales differ quite considerably, it may also be wise to focus the offerings on the meal deals based on the time of year it is offered.

Twitter and Instagram were the most successful advertising channels across 2Market, generating the most conversions. Social media channels outperformed their traditional counterparts by 2.5x across most demographics. Couples responded particularly well to Instagram ads, using Instagram to push the meal deals would be the most effective strategy. Brochures were almost useless therefore it would be recommended to eliminate that channel and reallocate the brochure budget into the other channels.

Montenegro and the USA offer incredible opportunities for 2Market. They both rank amongst the lowest with regards to overall spend and advertising spend, despite them being amongst the highest spend per capita and customer loyalty. 2Market should review the current marketing strategy and then align it with Spain's in these two locations. Given their customer loyalty numbers the initial spend on advertising would be repaid with repeat business in the years to come.

To increase the revenue generated from their advertising strategies, given the results of the above analysis, 2Market should broaden their social media advertising campaigns across other platforms. YouTube, TikTok and LinkedIn offer fantastic opportunities for 2Market to generate revenue across all demographics globally.

**Technical Recommendations**

With regards to the collected data, it was interesting to see that, despite the clear trend in income, the under 30 age bracket had amongst the highest earners. It would be useful to have more insight into the employment details of 2Market's customers to be able to validate the income data. It would also be ideal to have sight of the clicks on ads without conversions. With this data it would be possible to review the ads in question and see if there are any patterns in the most successful ads (time of ad, location, medium, interactivity etc.)

In terms of next steps, 2Market would benefit from a more granular dive into the sales data. Perhaps it's only certain alcohol lines that make it the most popular product. By having this insight 2Market may be able to roll out its most successful products across all locations and remove product lines that don't sell well.

# Appendices

**Assumptions**

When calculating the age of the population (calculated in Excel) the current year (2024) was assumed.

**Tools and Reasons for Use**

Excel was used for the initial data cleaning and exploratory analysis. The reason for this is twofold, Excel is very simple to use and the 2Market data would be considered low volume. Excel could quite easily handle the volume of data provided by 2Market.

SQL was used to carry out additional data analysis and minor data cleaning. The reason for SQLs use is it can better present data in tabular form, given certain parameters, than Excel is able to. With SQL, simple yet informative tables were created that gave a more useful picture of 2Market's sales and advertising channel data.

Finally, Tableau was used to create attractive and informative visualisations that will help 2Market stakeholders better understand the breakdown of their customer's demographics, spending habits and responsiveness to certain marketing campaigns. In order to analyse the seasonality of the sales data and advertising effectiveness, additional columns were added to the data used in tableau to reflect the season in which the sale was made.

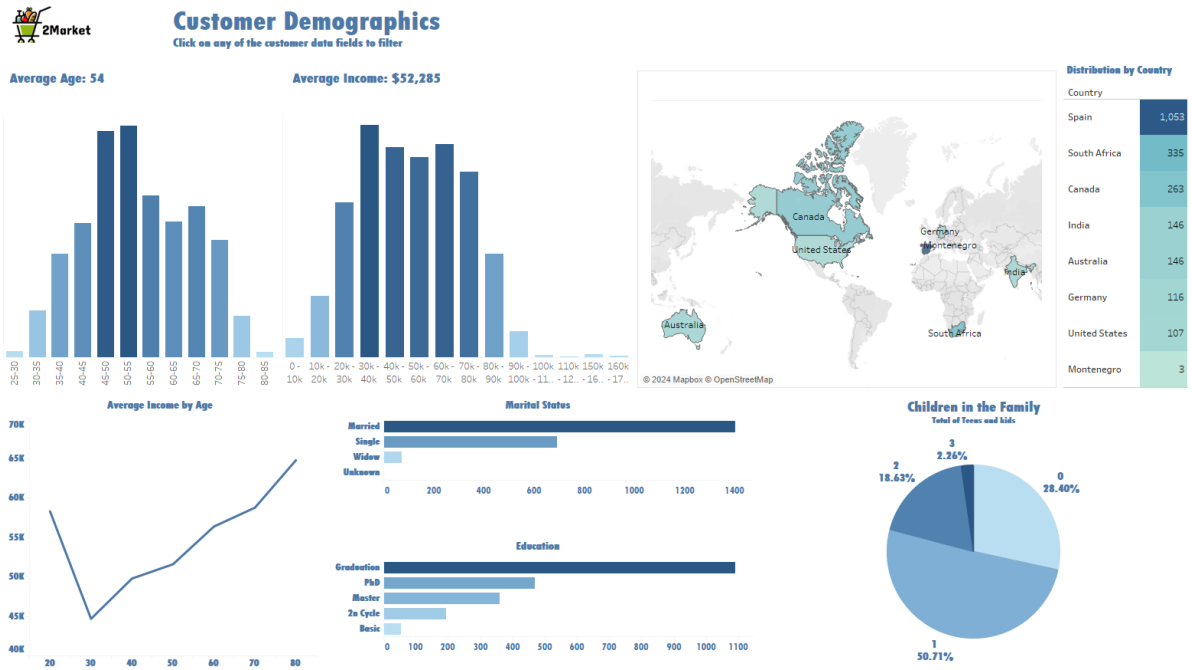
**Data Cleaning Process**

Data type columns were created to ensure all data type columns were as expected. Anomalies were identified and a decision was taken whether to include them. Anomalies included inconsistent marital statuses (Absurd and Yolo replaced with Unknown) and outliers included improbable ages (123, 124 and 130 years of age) these weren't removed from the population as they didn't significantly impact the data. Marital statuses of 'Divorced' and 'Alone' were updated as 'Single', and for the purposes of this analysis, 'Together' was changed to 'Married'. Finally, 47 duplicate records were removed from the data. While these records could have been considered individual records given their unique IDs, the decision was taken that their inclusion looked erroneous and would significantly alter the interpretation of the data.

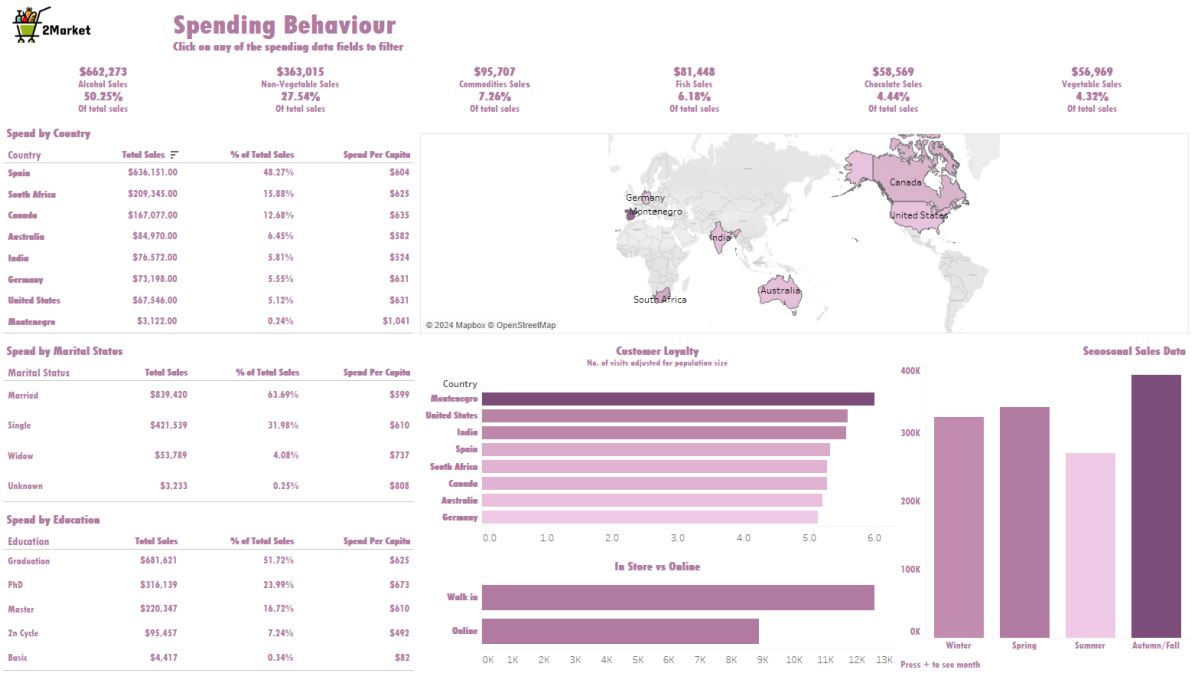
In SQL, the country codes were transformed into long form names to make the data more readable. The same full names were used in Tableau to be able to create the map visualisations.

## Dashboard

The demographics dashboard focuses on 3 areas, age, income and family/background, giving stakeholders detailed information on the makeup of 2Market's customer base.




The income dashboard dives deeper into where revenue was generated across 2Market's product offering by location, education level, marital status and season.




The advertising dashboard allows stakeholders to investigate the success of the ad channels utilised by 2Market by region and giving insight into where different ad types are more effective.

# Advertising Channels

Click on any of the ad data fields to filter

| $113,750 | $38,048 | $183,370 | $258,637 | $207,934 |
|---|---|---|---|---|
| Bulkmail Spend | Brochure Spend | Twitter Spend | Instagram Spend | Facebook Spend |
| 14.19% | 4.75% | 22.87% | 32.26% | 25.94% |
| Of total ad spend | Of total ad spend | Of total ad spend | Of total ad spend | Of total ad spend |

Education
All

## Ad Spend by Country

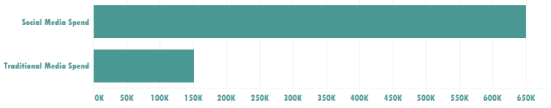
| Country | Brochure Spend | Bulkmail Spend | Facebook Spend | Instagram Spend | Twitter Spend | Total Ad Revenue | Ad Spend as % of T.. | Total Sales |
|---|---|---|---|---|---|---|---|---|
| Spain | $20,626 | $51,810 | $111,175 | $144,397 | $99,081 | $427,089 | 32.40% | $636,151 |
| South Africa | $4,282 | $13,287 | $31,211 | $35,738 | $26,748 | $111,266 | 8.44% | $209,345 |
| Canada | $6,397 | $16,199 | $27,650 | $30,954 | $25,261 | $106,461 | 8.08% | $167,077 |
| Australia | $0 | $9,866 | $10,480 | $18,505 | $7,915 | $46,766 | 3.55% | $84,970 |
| India | $3,736 | $9,779 | $8,963 | $9,444 | $8,129 | $40,051 | 3.04% | $76,572 |
| Germany | $3,007 | $7,949 | $9,649 | $12,551 | $11,538 | $44,694 | 3.39% | $73,198 |
| United States | $0 | $3,986 | $8,806 | $7,048 | $4,698 | $24,538 | 1.86% | $67,546 |
| Montenegro | $0 | $874 | $0 | $0 | $0 | $874 | 0.07% | $3,122 |


Marital Status
All

## Conversion Revenue

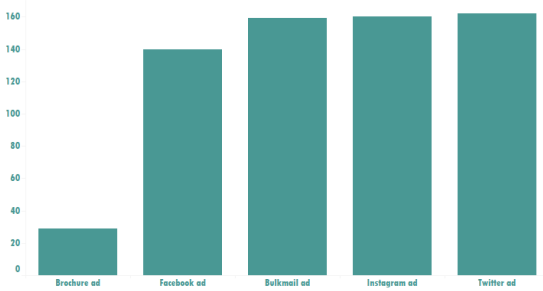

Conversion Revenue = Total ad spend/Conversions per customer

## Social Media vs Traditional Media




Social Media (Twitter, Facebook & Instagram)
Traditional Media (Brochure & Bulkmail)

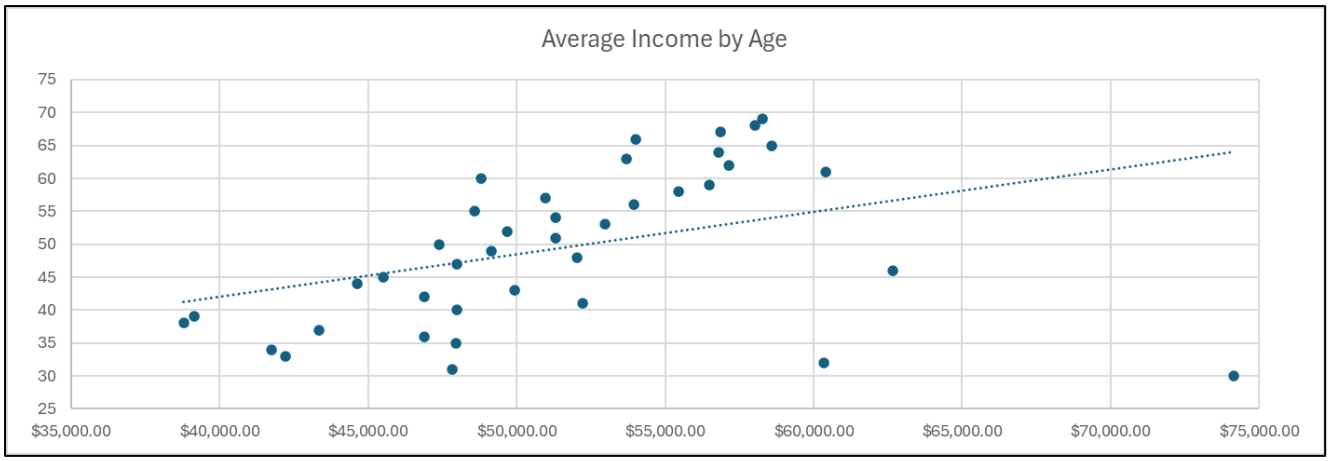
## Ad Channel Conversions



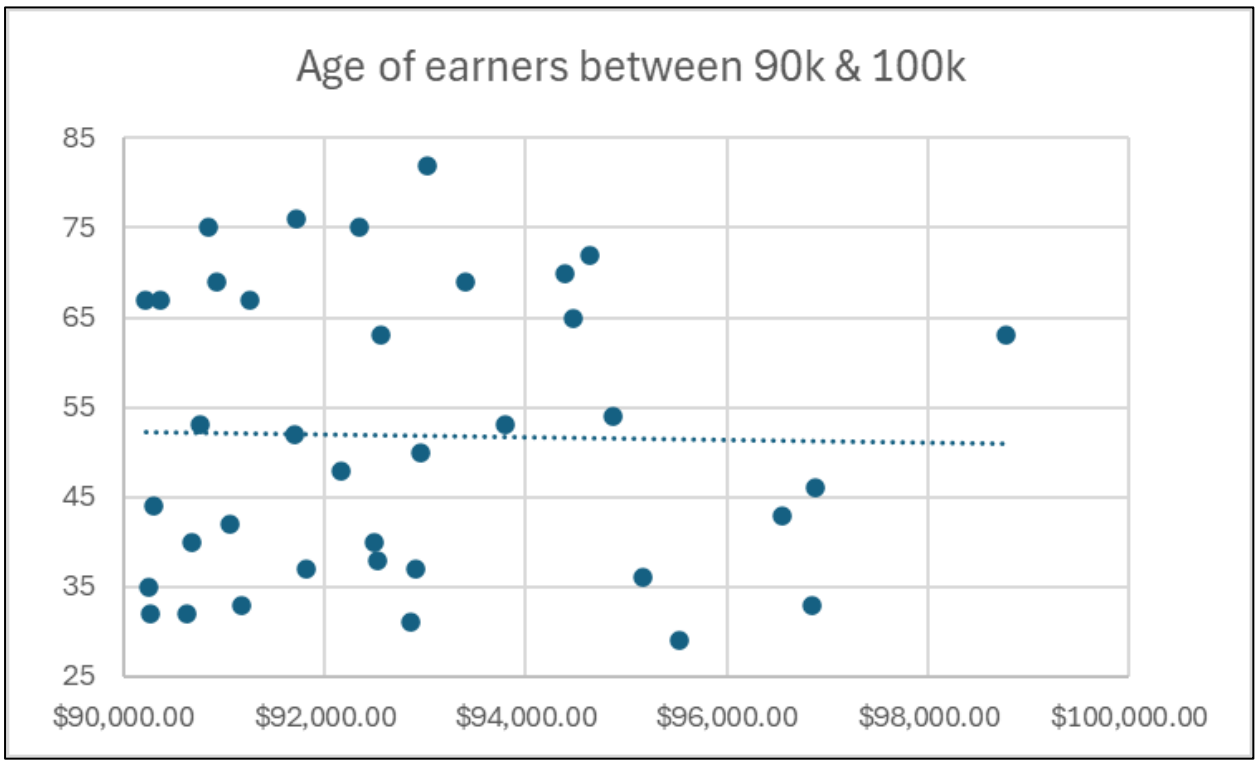

Income Range
All

## Additional Excel Visualisations

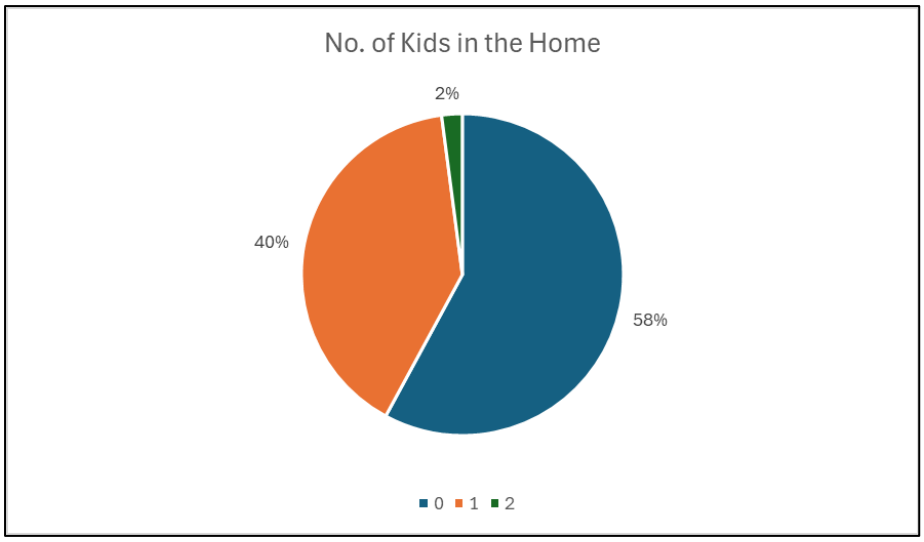
### Scatter Chart of the Average Income by Age

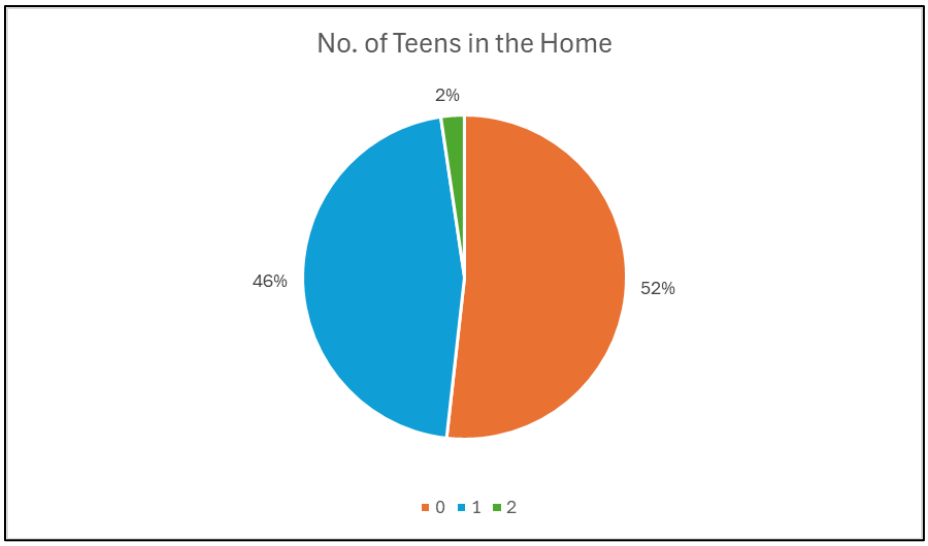


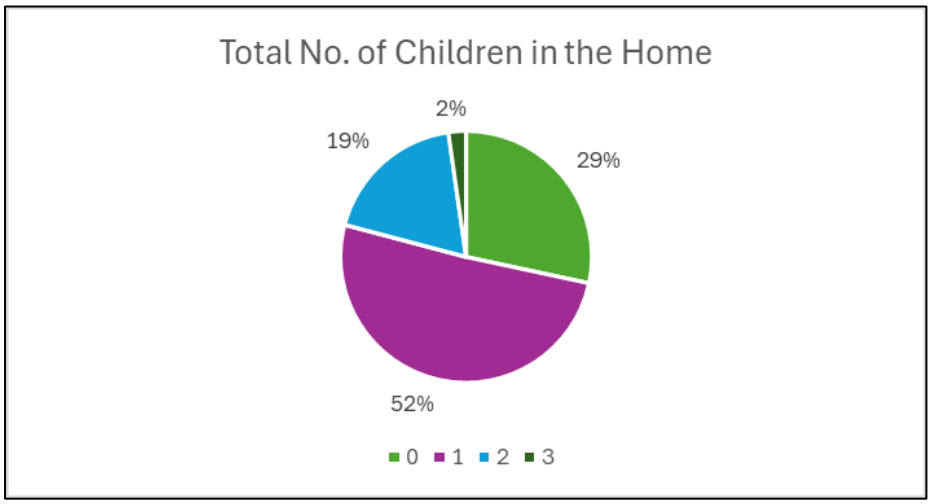

### Age of Customers Earning Between $90,000 and $100,000



**Children in the Home**



**SQL Syntax & Output**

**Creation of Marketing Data table**

Query | Query History

```
create table marketing_data(
    id integer,
    year_birth integer,
    age integer,
    education varchar(100),
    marital_status varchar(100),
    income numeric,
    kidhome integer,
    teenhome integer,
    totalchildhome integer,
    date_customer date,
    recency integer,
    amount_liquids integer,
    amount_veg integer,
    amount_nonveg integer,
    amount_fish integer,
    amount_choc integer,
    amount_commodities integer,
    num_of_deals integer,
    num_web_buy integer,
    num_store_buy integer,
    num_web_visits integer,
    response integer,
    complaints integer,
    country varchar(50),
    count_lead_conv integer
);
```

**Creation of ad data table**

```sql
-- Creating the ad data table
create table ad_data(
    id integer,
    bulkmail_ad integer,
    twitter_ad integer,
    insta_ad integer,
    fb_ad integer,
    brochure_ad integer
);
```

**Additional data cleaning, changing country codes to reflect full country names**

Query | Query History

```sql
-- Updating the country codes to reflect the full names of the country
update marketing_data
set country = 'Spain'
where country = 'SP';

update marketing_data
set country = 'South Africa'
where country = 'SA';

update marketing_data
set country = 'Canada'
where country = 'CA';

update marketing_data
set country = 'Australia'
where country = 'AUS';

update marketing_data
set country = 'India'
where country = 'IND';

update marketing_data
set country = 'Germany'
where country = 'GER';

update marketing_data
set country = 'United States of America'
where country = 'US';

update marketing_data
set country = 'Montenegro'
where country = 'ME';
```

**Syntax for total spend by country per capita**

```sql
-- Total spend by country and per capita
select country,
sum(amount_liquids + amount_veg + amount_nonveg
    + amount_fish + amount_choc + amount_commodities) as total_spend,
sum(amount_liquids + amount_veg + amount_nonveg
    + amount_fish + amount_choc + amount_commodities)/count(*) as total_spend_per_capita
from marketing_data
group by 1
order by total_spend_per_capita desc;
```

**Total Spend by country across products**

```sql
-- Total spend by country
select country,
    sum(amount_liquids) as alcohol,
    sum(amount_veg) as vegetables,
    sum(amount_nonveg) as non_vegetable_products,
    sum(amount_fish) as fish,
    sum(amount_choc) as chocolate,
    sum(amount_commodities) as commodities,
    sum(amount_liquids + amount_veg + amount_nonveg +
        amount_fish + amount_choc + amount_commodities) as total_sales
from marketing_data
group by country
order by total_sales desc;
```

**Total spend by marital status**

```sql
-- Total spend by product category by marital status
select marital_status,
    sum(amount_liquids) as alcohol,
    sum(amount_veg) as vegetables,
    sum(amount_nonveg) as non_vegetable_products,
    sum(amount_fish) as fish,
    sum(amount_choc) as chocolate,
    sum(amount_commodities) as commodities,
    sum(amount_liquids + amount_veg + amount_nonveg +
        amount_fish + amount_choc + amount_commodities) as total_sales
from marketing_data
group by 1
order by total_sales desc;
```

**Total spend by education level**

```sql
-- Total spend by product category by education level
select education,
    sum(amount_liquids) as alcohol,
    sum(amount_veg) as vegetables,
    sum(amount_nonveg) as non_vegetable_products,
    sum(amount_fish) as fish,
    sum(amount_choc) as chocolate,
    sum(amount_commodities) as commodities,
    sum(amount_liquids + amount_veg + amount_nonveg +
        amount_fish + amount_choc + amount_commodities) as total_sales
from marketing_data
group by 1
order by total_sales desc;
```

**Total Spend by age bracket**

```sql
-- Product sales by age bracket
select
case
    when age between 20 and 30 then '20-30'
    when age between 31 and 40 then '31-40'
    when age between 41 and 50 then '41-50'
    when age between 51 and 60 then '51-60'
    when age between 61 and 70 then '61-70'
    else ' Over 70'
end as age_bracket,
sum(amount_liquids) as alcohol,
    sum(amount_veg) as vegetables,
    sum(amount_nonveg) as non_vegetable_products,
    sum(amount_fish) as fish,
    sum(amount_choc) as chocolate,
    sum(amount_commodities) as commodities,
    sum(amount_liquids + amount_veg + amount_nonveg +
        amount_fish + amount_choc + amount_commodities) as total_sales
from marketing_data
group by age_bracket
order by total_sales desc;
```

**Product sales by number of children in the home**

```sql
-- Product sales by number of children
select
case
    when totalchildhome = 0 then 'No Children'
    when totalchildhome = 1 then '1 Child'
    when totalchildhome = 2 then '2 Children'
    when totalchildhome = 3 then '3 Children'
end as no_of_children,
sum(amount_liquids) as alcohol,
    sum(amount_veg) as vegetables,
    sum(amount_nonveg) as non_vegetable_products,
    sum(amount_fish) as fish,
    sum(amount_choc) as chocolate,
    sum(amount_commodities) as commodities,
    sum(amount_liquids + amount_veg + amount_nonveg +
        amount_fish + amount_choc + amount_commodities) as total_sales
from marketing_data
group by no_of_children
order by total_sales desc;
```

**Total spend grouped by marital status and number of children**

| | marital_status character varying (100) | no_of_children text | alcohol bigint | vegetables bigint | non_vegetable_products bigint | fish bigint | chocolate bigint | commodities bigint | total_sales bigint |
|---|---|---|---|---|---|---|---|---|---|
| 1 | Married | No Children | 182492 | 19623 | 139210 | 29182 | 19772 | 24001 | 414280 |
| 2 | Single | No Children | 107051 | 11149 | 80864 | 15474 | 11524 | 13594 | 239656 |
| 3 | Widow | No Children | 12219 | 1256 | 9286 | 2091 | 1479 | 1971 | 28302 |
| 4 | Unknown | No Children | 711 | 169 | 625 | 411 | 61 | 408 | 2385 |
| 5 | Married | 3 Children | 6142 | 195 | 1960 | 212 | 121 | 603 | 9233 |
| 6 | Single | 3 Children | 1900 | 104 | 1013 | 54 | 133 | 301 | 3505 |
| 7 | Married | 2 Children | 39871 | 2171 | 13448 | 3048 | 2332 | 6257 | 67127 |
| 8 | Single | 2 Children | 15533 | 868 | 6362 | 1172 | 869 | 3598 | 28402 |
| 9 | Widow | 2 Children | 2039 | 166 | 1116 | 416 | 184 | 455 | 4376 |
| 10 | Married | 1 Child | 196299 | 13877 | 74987 | 19272 | 15014 | 29331 | 348780 |
| 11 | Single | 1 Child | 84229 | 6579 | 30800 | 8984 | 5998 | 13386 | 149976 |
| 12 | Widow | 1 Child | 13143 | 806 | 3244 | 1124 | 1076 | 1718 | 21111 |
| 13 | Unknown | 1 Child | 644 | 6 | 100 | 8 | 6 | 84 | 848 |

**Spend by various demographics**

Alcohol is the most popular product across all demographics, again, followed by non-veg products.

| | marital_status character varying (100) | alcohol bigint | vegetables bigint | non_vegetable_products bigint | fish bigint | chocolate bigint | commodities bigint | total_sales bigint |
|---|---|---|---|---|---|---|---|---|
| 1 | Married | 424804 | 35866 | 229605 | 51714 | 37239 | 60192 | 839420 |
| 2 | Single | 208713 | 18700 | 119039 | 25684 | 18524 | 30879 | 421539 |
| 3 | Widow | 27401 | 2228 | 13646 | 3631 | 2739 | 4144 | 53789 |
| 4 | Unknown | 1355 | 175 | 725 | 419 | 67 | 492 | 3233 |

| | education character varying (100) | alcohol bigint | vegetables bigint | non_vegetable_products bigint | fish bigint | chocolate bigint | commodities bigint | total_sales bigint |
|---|---|---|---|---|---|---|---|---|
| 1 | Graduation | 312568 | 33777 | 197872 | 47609 | 34310 | 55485 | 681621 |
| 2 | PhD | 190034 | 9228 | 79680 | 12375 | 9511 | 15311 | 316139 |
| 3 | Master | 120383 | 7783 | 58718 | 11368 | 7480 | 14615 | 220347 |
| 4 | 2n Cycle | 38897 | 5581 | 26127 | 9175 | 6614 | 9063 | 95457 |
| 5 | Basic | 391 | 600 | 618 | 921 | 654 | 1233 | 4417 |

| | age_bracket text | alcohol bigint | vegetables bigint | non_vegetable_products bigint | fish bigint | chocolate bigint | commodities bigint | total_sales bigint |
|---|---|---|---|---|---|---|---|---|
| 1 | 51-60 | 185220 | 15603 | 92828 | 20576 | 15190 | 26846 | 356263 |
| 2 | 61-70 | 169363 | 12601 | 82842 | 19192 | 13272 | 21465 | 318735 |
| 3 | 41-50 | 147515 | 13835 | 86885 | 20946 | 14790 | 22809 | 306780 |
| 4 | Over 70 | 89984 | 6626 | 46309 | 10040 | 6799 | 12008 | 171766 |
| 5 | 31-40 | 64834 | 7655 | 49024 | 9288 | 7827 | 11537 | 150165 |
| 6 | 20-30 | 5357 | 649 | 5127 | 1406 | 691 | 1042 | 14272 |

| | no_of_children text | alcohol bigint | vegetables bigint | non_vegetable_products bigint | fish bigint | chocolate bigint | commodities bigint | total_sales bigint |
|---|---|---|---|---|---|---|---|---|
| 1 | No Children | 302473 | 32197 | 229985 | 47158 | 32836 | 39974 | 684623 |
| 2 | 1 Child | 294315 | 21268 | 109131 | 29388 | 22094 | 44519 | 520715 |
| 3 | 2 Children | 57443 | 3205 | 20926 | 4636 | 3385 | 10310 | 99905 |
| 4 | 3 Children | 8042 | 299 | 2973 | 266 | 254 | 904 | 12738 |

**Syntax for ad channel effectiveness**

```
176  -- Traiditonal media vs social media channels
177  select marital_status,
178      sum(ad.twitter_ad + ad.insta_ad + ad.fb_ad) as social_media,
179      sum(ad.bulkmail_ad + ad.brochure_ad) as traditional_promotions
180  from marketing_data
181  join ad_data ad
182  using (id)
183  group by marital_status;
184
185  -- The most effective social media ad campaigns by country
186  select country,
187      sum(ad.twitter_ad) as twitter,
188      sum(ad.insta_ad) as instagram,
189      sum(ad.fb_ad) as facebook
190  from marketing_data md
191  left join ad_data ad
192  using (id)
193  group by country;
```

**Ad channel effectiveness by marital status**

| | marital_status character varying (100) | social_media bigint | traditional_promotions bigint |
|---|---|---|---|
| 1 | Unknown | 2 | 0 |
| 2 | Married | 305 | 117 |
| 3 | Widow | 22 | 4 |
| 4 | Single | 133 | 67 |

| | marital_status character varying (100) | twitter bigint | instagram bigint | facebook bigint |
|---|---|---|---|---|
| 1 | Unknown | 0 | 1 | 1 |
| 2 | Married | 103 | 109 | 93 |
| 3 | Widow | 10 | 7 | 5 |
| 4 | Single | 49 | 43 | 41 |

## Syntax for ad revenue per ad channel by country

```sql
-- Which social media channel generated the most ad revenue in the form of customer spend by country
with ad_revenue as (
    select
        md.country,
        sum(case when ad.insta_ad > 0 then md.amount_liquids + md.amount_veg + md.amount_nonveg + md.amount_fish + md.amount_choc + md.amount_commodities else 0 end) as total_insta,
        sum(case when ad.twitter_ad > 0 then md.amount_liquids + md.amount_veg + md.amount_nonveg + md.amount_fish + md.amount_choc + md.amount_commodities else 0 end) as total_twitter,
        sum(case when ad.fb_ad > 0 then md.amount_liquids + md.amount_veg + md.amount_nonveg + md.amount_fish + md.amount_choc + md.amount_commodities else 0 end) as total_facebook,
        sum(case when ad.bulkmail_ad > 0 then md.amount_liquids + md.amount_veg + md.amount_nonveg + md.amount_fish + md.amount_choc + md.amount_commodities else 0 end) as total_bulkmail,
        sum(case when ad.brochure_ad > 0 then md.amount_liquids + md.amount_veg + md.amount_nonveg + md.amount_fish + md.amount_choc + md.amount_commodities else 0 end) as total_brochure,
        sum(md.amount_liquids + md.amount_veg + md.amount_nonveg + md.amount_fish + md.amount_choc + md.amount_commodities) as total_spend
    from ad_data ad
    join marketing_data md
        using (id)
    group by md.country
)

select ar.country,
    ar.total_insta,
    ar.total_twitter,
    ar.total_facebook,
    ar.total_bulkmail,
    ar.total_brochure,
    sum(ar.total_insta + ar.total_twitter + ar.total_facebook + ar.total_bulkmail + ar.total_brochure) as total_all_channels,
    round(cast(sum(ar.total_insta + ar.total_twitter + ar.total_facebook + ar.total_bulkmail + ar.total_brochure)/ar.total_spend * 100 as numeric),0) as percent_of_spend,
    ar.total_spend
from ad_revenue ar
group by ar.country, ar.total_insta, ar.total_twitter, ar.total_facebook, ar.total_bulkmail, ar.total_brochure, ar.total_spend
order by ar.total_spend desc;
```