Final Project - First Visualization

Group 10

2025-11-03

Question statement:

What is the most popular payment method among customers in the United Kingdom (UK) and the United States (USA) based on recent e-commerce transaction data?

Library Setup

```
library(tidyverse)
```

```
## -- Attaching core tidyverse packages ------------------------ tidyverse 2.0.0 --
## v dplyr     1.1.4     v readr     2.1.5
## v forcats   1.0.0     v stringr   1.5.1
## v ggplot2   4.0.0     v tibble    3.3.0
## v lubridate 1.9.4     v tidyr     1.3.1
## v purrr     1.1.0
## -- Conflicts ------------------------------------------ tidyverse_conflicts() --
## x dplyr::filter() masks stats::filter()
## x dplyr::lag()    masks stats::lag()
## i Use the conflicted package (<http://conflicted.r-lib.org/>) to force all conflicts to become errors
```

```
library(stringr)
library(dplyr)
library(ggplot2)
library(lubridate)
library(tidytext)
```

```
## Warning: package 'tidytext' was built under R version 4.5.2
```

Data Importing

```
ecommerce <- read.csv('ecommerce_dataset_10000.csv')

head(ecommerce)
```

```
##   customer_id  first_name last_name gender age_group signup_date country
## 1    CUST2353       Erica    Oliver Female Teenagers  2022-06-29  Canada
## 2    CUST4463 Christopher     White   Male    Adults  2023-08-24   China
## 3    CUST4512     Spencer    Foster   Male    Senior  2023-07-18 Germany
## 4    CUST5711     Jessica    Harris   Male Teenagers  2025-08-22  France
## 5    CUST1296         Amy   Johnson Female Teenagers  2021-03-23  Brazil
## 6    CUST2790      Shelby    Sutton  Other    Adults  2025-07-18  Canada
##   product_id         product_name       category quantity unit_price order_id
## 1    PROD108       Fitbit Versa 3    Electronics        3        229 ORD10000
## 2    PROD103         Levi's Jeans        Apparel        4         59 ORD10001
## 3    PROD111   Lego Star Wars Set           Toys        2         59 ORD10002
## 4    PROD107         Dyson Vacuum Home & Kitchen        4        399 ORD10003
## 5    PROD105 Adidas Running Shoes        Apparel        1        110 ORD10004
## 6    PROD108       Fitbit Versa 3    Electronics        5        229 ORD10005
##   order_date order_status   payment_method rating review_text review_id
## 1 2023-07-13      Pending      Credit Card      2        good  REV20000
## 2 2024-08-12      Pending           PayPal      2     average  REV20001
## 3 2024-08-04    Delivered Cash on Delivery      5        good  REV20002
## 4 2025-05-23    Delivered Cash on Delivery      2   very good  REV20003
## 5 2023-07-02     Returned Cash on Delivery      1   very good  REV20004
## 6 2023-04-13     Returned           PayPal      3   very good  REV20005
##   review_date
## 1  2025-06-06
## 2  2023-08-05
## 3  2023-01-03
## 4  2023-03-14
## 5  2023-10-18
## 6  2023-02-14
```

Data Cleaning

```
ecommerce <- ecommerce %>%
  mutate(
    order_year = year(ymd(order_date))
  )
summary(ecommerce$order_year)
```

```
##    Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
##    2022    2023    2024    2024    2024    2025
```

```
ecommerce_clean <- ecommerce %>%
  filter(
    !is.na(payment_method),
    country %in% c("UK", "USA"),
    order_year %in% c(2022, 2024)
  )

head(ecommerce_clean)
```

```
##   customer_id first_name last_name gender age_group signup_date country
```

```
## 1    CUST2451    Barbara    Hansen Female    Adults  2024-11-10      UK
## 2    CUST1438   Michelle    Vargas   Male    Adults  2023-07-11      UK
## 3    CUST2997     Amanda  Martinez Female    Senior  2021-06-02     USA
## 4    CUST2895   Lawrence     Hines Female    Senior  2021-03-15     USA
## 5    CUST1182       John    Jacobs   Male    Senior  2023-03-09      UK
## 6    CUST4751      Tyler    Martin   Male    Adults  2020-11-07     USA
##   product_id         product_name    category quantity unit_price order_id
## 1    PROD103         Levi's Jeans     Apparel        2         59 ORD10007
## 2    PROD109    Kindle Paperwhite       Books        1        129 ORD10012
## 3    PROD105 Adidas Running Shoes     Apparel        3        110 ORD10025
## 4    PROD102      Sony Headphones Electronics        5        199 ORD10029
## 5    PROD113 Wilson Tennis Racket      Sports        3        149 ORD10035
## 6    PROD112    Barbie Dreamhouse        Toys        3        199 ORD10047
##   order_date order_status   payment_method rating review_text review_id
## 1 2024-01-29      Pending      Credit Card      1   very good  REV20007
## 2 2024-05-15      Shipped      Credit Card      1    very bad  REV20012
## 3 2024-05-21      Pending Cash on Delivery      2     average  REV20025
## 4 2024-12-31    Cancelled      Credit Card      5   very good  REV20029
## 5 2022-12-11    Cancelled           PayPal      5     average  REV20035
## 6 2024-12-28    Cancelled      Credit Card      1     average  REV20047
##   review_date order_year
## 1  2025-06-02       2024
## 2  2024-12-28       2024
## 3  2023-06-05       2024
## 4  2024-12-04       2024
## 5  2024-02-20       2022
## 6  2024-12-07       2024
```

Calculate Most Popular Payment Method by Country

UK Most Popular Payment Method

```
payment_summary_uk <- ecommerce_clean %>%
  filter(country == "UK", order_year %in% c(2022, 2024)) %>%
  group_by(order_year, payment_method) %>%
  summarise(total_transactions = n(), .groups = "drop")

payment_summary_uk
```

```
## # A tibble: 6 x 3
##   order_year payment_method   total_transactions
##        <dbl> <chr>                         <int>
## 1       2022 Cash on Delivery                 30
## 2       2022 Credit Card                      39
## 3       2022 PayPal                           38
## 4       2024 Cash on Delivery                101
## 5       2024 Credit Card                     103
## 6       2024 PayPal                          102
```

```r
top_methods_uk <- payment_summary_uk %>%
  group_by(payment_method) %>%
  summarise(overall = sum(total_transactions)) %>%
  slice_max(overall, n = 3) %>%
  pull(payment_method)

top_methods_uk
```

```
## [1] "Credit Card"      "PayPal"           "Cash on Delivery"
```

USA Most Popular Payment Method

```r
payment_summary_usa <- ecommerce_clean %>%
  filter(country == "USA", order_year %in% c(2022, 2024)) %>%
  group_by(order_year, payment_method) %>%
  summarise(total_transactions = n(), .groups = "drop")

payment_summary_usa
```

```
## # A tibble: 6 x 3
##   order_year payment_method   total_transactions
##        <dbl> <chr>                         <int>
## 1       2022 Cash on Delivery                 42
## 2       2022 Credit Card                      49
## 3       2022 PayPal                           33
## 4       2024 Cash on Delivery                126
## 5       2024 Credit Card                     117
## 6       2024 PayPal                           98
```

```r
top_methods_usa <- payment_summary_usa %>%
  group_by(payment_method) %>%
  summarise(overall = sum(total_transactions)) %>%
  slice_max(overall, n = 3) %>%
  pull(payment_method)

top_methods_usa
```

```
## [1] "Cash on Delivery" "Credit Card"      "PayPal"
```

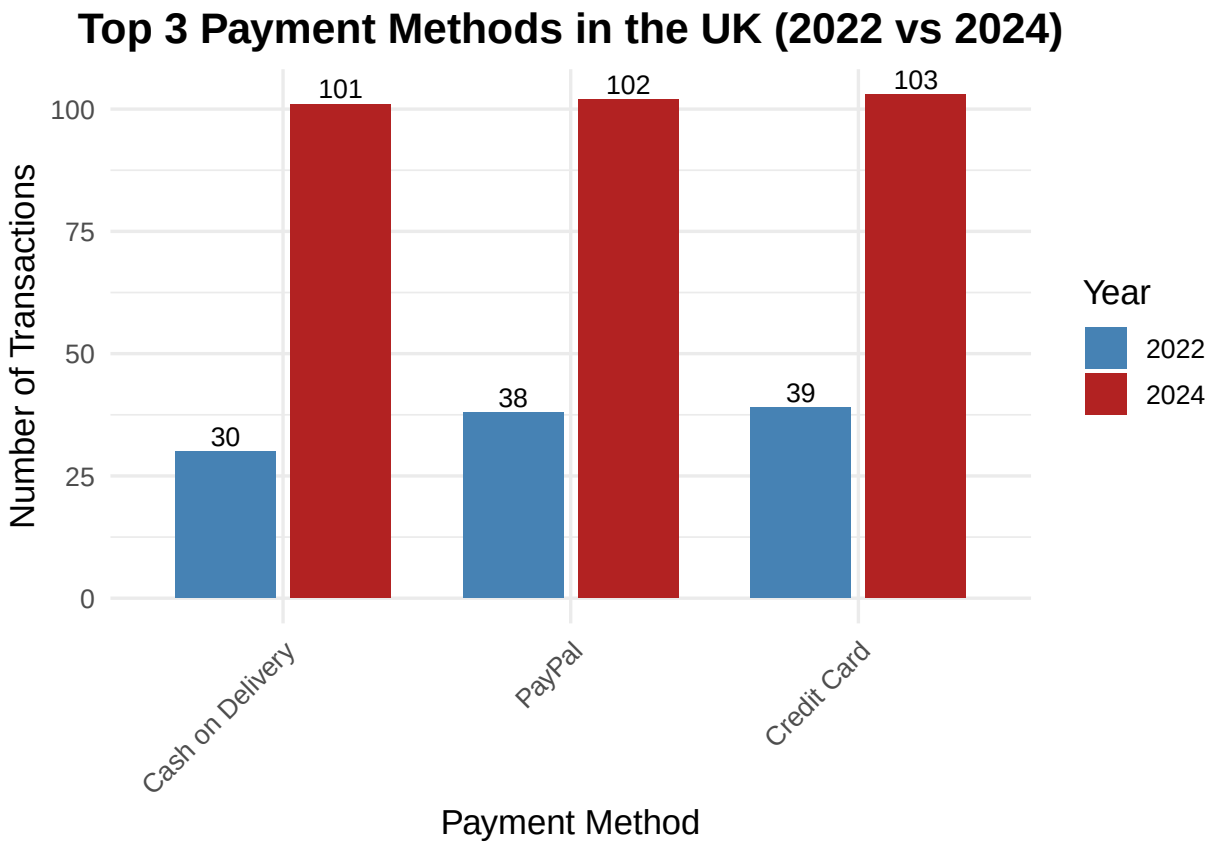
Visualization Section

UK Visualization

```r
payment_summary_uk <- payment_summary_uk %>%
  filter(payment_method %in% top_methods_uk)

ggplot(payment_summary_uk,
```

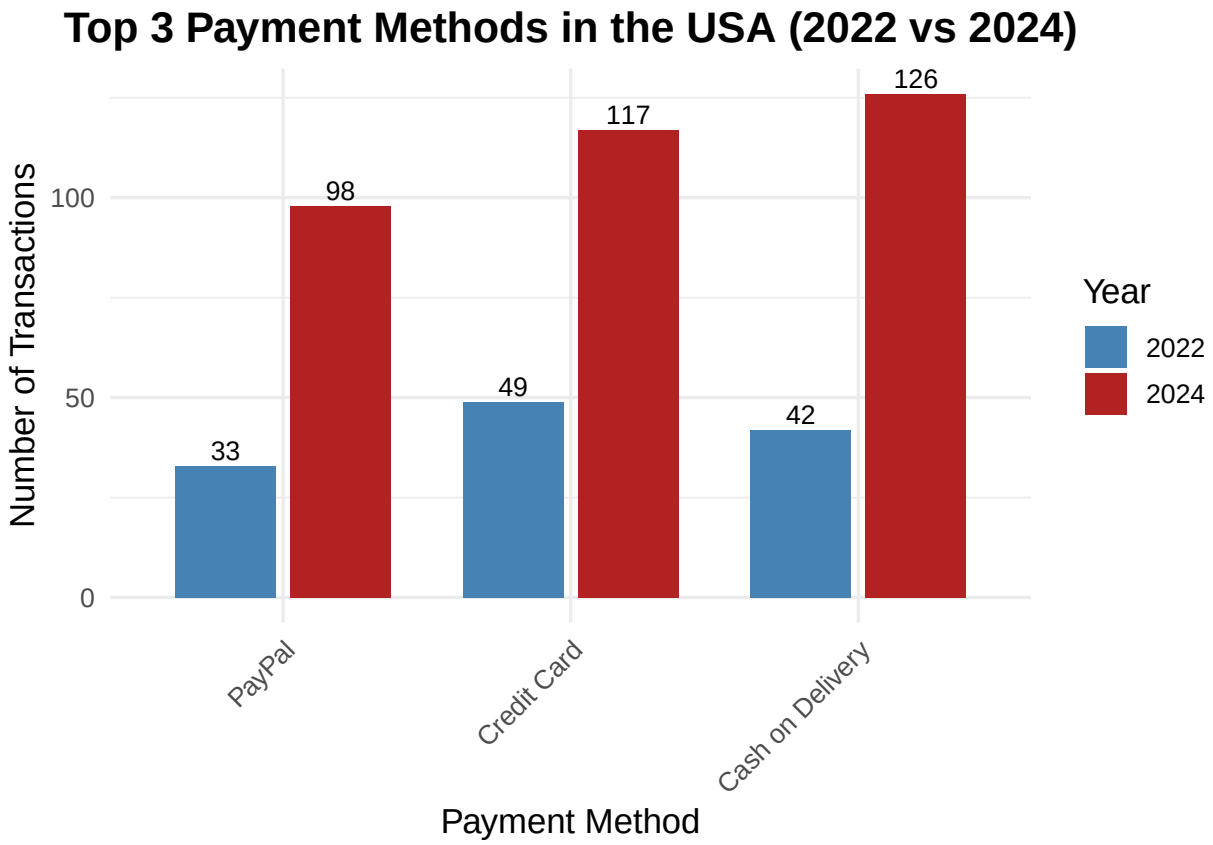
```
      aes(x = reorder(payment_method, total_transactions, FUN = sum),
          y = total_transactions,
          fill = as.factor(order_year),
          label = total_transactions)) +
geom_col(position = position_dodge(width = 0.8), width = 0.7) +
geom_text(position = position_dodge(width = 0.8),
           vjust = -0.3, size = 3.5) +
scale_fill_manual(
  values = c("2022" = "steelblue", "2024" = "firebrick"),
  name = "Year"
) +
labs(
  title = "Top 3 Payment Methods in the UK (2022 vs 2024)",
  x = "Payment Method",
  y = "Number of Transactions"
) +
theme_minimal(base_size = 13) +
theme(
  plot.title = element_text(hjust = 0.5, face = "bold"),
  axis.text.x = element_text(angle = 45, hjust = 1)
)
```



USA Visualization

```
payment_summary_usa <- payment_summary_usa %>%
  filter(payment_method %in% top_methods_usa)

ggplot(payment_summary_usa,
       aes(x = reorder(payment_method, total_transactions, FUN = sum),
           y = total_transactions,
           fill = as.factor(order_year),
           label = total_transactions)) +
  geom_col(position = position_dodge(width = 0.8), width = 0.7) +
  geom_text(position = position_dodge(width = 0.8),
            vjust = -0.3, size = 3.5) +
  scale_fill_manual(
    values = c("2022" = "steelblue", "2024" = "firebrick"),
    name = "Year"
  ) +
  labs(
    title = "Top 3 Payment Methods in the USA (2022 vs 2024)",
    x = "Payment Method",
    y = "Number of Transactions"
  ) +
  theme_minimal(base_size = 13) +
  theme(
    plot.title = element_text(hjust = 0.5, face = "bold"),
    axis.text.x = element_text(angle = 45, hjust = 1)
  )
```


Top 3 Payment Methods in the USA (2022 vs 2024)
Number of Transactions
0
50
100
33
98
49
117
42
126
PayPal
Credit Card
Cash on Delivery
Payment Method
Year
2022
2024