Telecom Customer Churn Analysis
This telecommunication company provides phone and internet services in california referred to as M telecom.

Firstly lets define what <u>Churn</u> is? Churn is the measurement of the percentage of accounts/customers who choose not to renew their subscriptions or stop doing business with a company.
Hence Churn rate is the rate at which customers stops doing business with a company.

The telecommunication industry is a highly competitive one and i would be carrying out indept analysis to determine the following;

1. How many customers joined the company during the last quarter?
2. What steps can M Telecom take to reduce churn?
3. What are the key drivers of customer churn?
4. Is the company losing high value customers? If so, how can they retain them?
5. A churn profile showing the typical features of a customer susceptible to churn.

Strategy
Dataset was downloaded from [Maven Analytics](#) and it contained information about customer demographics, subscription plans and account records for the Telecom.

As a data analyst understanding the data received is important, and one of the ways to understand your data is by going through the data dictionary.

Table	Field	Description
Customer Ch	CustomerID	A unique ID that identifies each customer
Customer Ch	Gender	The customer's gender: Male, Female
Customer Ch	Age	The customer's current age, in years, at the time the fiscal quarter ended (Q2 2022)
Customer Ch	Married	Indicates if the customer is married: Yes, No
Customer Ch	Number of Dependents	Indicates the number of dependents that live with the customer (dependents could be children, parents, grandparents, etc.)
Customer Ch	City	The city of the customer's primary residence in California
Customer Ch	Zip Code	The zip code of the customer's primary residence
Customer Ch	Latitude	The latitude of the customer's primary residence
Customer Ch	Longitude	The longitude of the customer's primary residence
Customer Ch	Number of Referrals	Indicates the number of times the customer has referred a friend or family member to this company to date
Customer Ch	Tenure in Months	Indicates the total amount of months that the customer has been with the company by the end of the quarter specified above
Customer Ch	Offer	Identifies the last marketing offer that the customer accepted: None, Offer A, Offer B, Offer C, Offer D, Offer E
Customer Ch	Phone Service	Indicates if the customer subscribes to home phone service with the company: Yes, No
Customer Ch	Avg Monthly Long Distance Charges	Indicates the customer's average long distance charges, calculated to the end of the quarter specified above (if the customer is not subscribed to home phone service, this will be 0)
Customer Ch	Multiple Lines	Indicates if the customer subscribes to multiple telephone lines with the company: Yes, No (if the customer is not subscribed to home phone service, this will be No)
Customer Ch	Internet Service	Indicates if the customer subscribes to Internet service with the company: Yes, No
Customer Ch	Internet Type	Indicates the customer's type of internet connection: DSL, Fiber Optic, Cable (if the customer is not subscribed to internet service, this will be None)
Customer Ch	Avg Monthly GB Download	Indicates the customer's average download volume in gigabytes, calculated to the end of the quarter specified above (if the customer is not subscribed to internet service, this will be 0)
Customer Ch	Online Security	Indicates if the customer subscribes to an additional online security service provided by the company: Yes, No (if the customer is not subscribed to internet service, this will be No)
Customer Ch	Online Backup	Indicates if the customer subscribes to an additional online backup service provided by the company: Yes, No (if the customer is not subscribed to internet service, this will be No)
Customer Ch	Device Protection Plan	Indicates if the customer subscribes to an additional device protection plan for their Internet equipment provided by the company: Yes, No (if the customer is not subscribed to internet service, this will be No)
Customer Ch	Premium Tech Support	Indicates if the customer subscribes to an additional technical support plan from the company with reduced wait times: Yes, No (if the customer is not subscribed to internet service, this will be No)
Customer Ch	Streaming TV	Indicates if the customer uses their Internet service to stream television programing from a third party provider at no additional fee: Yes, No (if the customer is not subscribed to internet service, this will be No)
Customer Ch	Streaming Movies	Indicates if the customer uses their Internet service to stream movies from a third party provider at no additional fee: Yes, No (if the customer is not subscribed to internet service, this will be No)
Customer Ch	Streaming Music	Indicates if the customer uses their Internet service to stream music from a third party provider at no additional fee: Yes, No (if the customer is not subscribed to internet service, this will be No)
Customer Ch	Unlimited Data	Indicates if the customer has paid an additional monthly fee to have unlimited data downloads/uploads: Yes, No (if the customer is not subscribed to internet service, this will be No)
Customer Ch	Contract	Indicates the customer's current contract type: Month-to-Month, One Year, Two Year
Customer Ch	Paperless Billing	Indicates if the customer has chosen paperless billing: Yes, No
Customer Ch	Payment Method	Indicates how the customer pays their bill: Bank Withdrawal, Credit Card, Mailed Check
Customer Ch	Monthly Charge	Indicates the customer's current total monthly charge for all their services from the company
Customer Ch	Total Charges	Indicates the customer's total charges, calculated to the end of the quarter specified above
Customer Ch	Total Refunds	Indicates the customer's total refunds, calculated to the end of the quarter specified above
Customer Ch	Total Extra Data Charges	Indicates the customer's total charges for extra data downloads above those specified in their plan, by the end of the quarter specified above
Customer Ch	Total Long Distance Charges	Indicates the customer's total charges for long distance above those specified in their plan, by the end of the quarter specified above
Customer Ch	Total Revenue	Indicates the company's total revenue from this customer, calculated to the end of the quarter specified above (Total Charges - Total Refurnds + Total Extra Data Charges + Total Lond Distance Charges)
Customer Ch	Customer Status	Indicates the status of the customer at the end of the quarter: Churned, Stayed, or Joined
Customer Ch	Churn Category	A high-level category for the customer's reason for churning, which is asked when they leave the company: Attitude, Competitor, Dissatisfaction, Other, Price (directly related to Churn Reason)
Customer Ch	Churn Reason	A customer's specific reason for leaving the company, which is asked when they leave the company (directly related to Churn Category)
Zip Code Pop	Zip Code	The zip code of the customer's primary residence
Zip Code Pop	Population	A current population estimate for the entire Zip Code area

The main steps for this project are:

- Data Cleaning and Preparation
- Exploratory Data Analysis
- Data Insights
- Customer Retention Strategies
- Data Visualisation

Data Cleaning and Preparation ;

The dataset was first loaded into excel and cleaned. Firstly the column names had to be renamed appropriately to sql standard by removing the space between the names and replacing them with "_". There were alot of empty fields which I had to replace using the Null Value to preserve the integrity of the data for it not to be truncated while loading into MySql Workbench.

After loading into MySql Workbench, I checked for duplicates in the unique key(Customer_ID) and found none.

```
-- Check for duplicates--
SELECT Customer_ID, COUNT( Customer_ID ) as count
FROM  default_schema.churn
GROUP BY Customer_ID
HAVING count(Customer_ID) > 1;
```

Result Grid	Filter Rows: Q Search	Export:
Customer_ID	count	

Exploratory Data Analysis ;

1. a**How many customers were in the dataset?**

```
-- Find total number of customers
SELECT
COUNT(DISTINCT Customer_ID) AS customer_count
FROM default_schema.churn
```

There are 7043 customers in total

Result Grid	Filter Rows: Q Search	Export:
customer_count		
▶ 7043		

2. **How many customers and revenue were lost to churn ?**

```
-- How much revenue did M telecom lose to churned customers?
SELECT Customer_Status,
COUNT(Customer_ID) AS customer_count,
```

```
ROUND((SUM(Total_Revenue) * 100.0) / SUM(SUM(Total_Revenue))
OVER(), 1) AS Revenue_Percentage
FROM default_schema.churn
GROUP BY Customer_Status;
```

Customer_Status	customer_count	Revenue_Percenta... ^
Joined	454	0.3
Churned	1869	17.2
Stayed	4720	82.5

As shown, the total number of customers is 7,043. Out of which, 1869 are no longer customers. This indicates a 26.54% churn rate (industry standard is 31%). Retention is at a rate of 73.46%, which is quite laudable. While the churn rate is not skyrocket high, the team can take proactive measures to reduce it as 17.2% of the company revenue is lost to churn.

```
-- How much revenue has M Telecom lost?
 SELECT
   Customer_Status,
   CEILING(SUM(Total_Revenue)) AS Revenue,    -- ceiling is used to Round up
the figures--
   ROUND((SUM(Total_Revenue) * 100.0) / SUM(SUM(Total_Revenue)) OVER(), 1) AS
Revenue_Percentage
FROM
   default_schema.churn
GROUP BY
   Customer_Status;
```

Customer_Status	Revenue	Revenue_Percentage
► Churned	3684460	17.2
Joined	54280	0.3
Stayed	17632393	82.5

As seen the 17.2% loss of revenue equated to $3,684,460(approx $3.7 million)

3. Average Tenure in Months and Average Monthly Charges of customers:

Tenure is the number of months a customer has been with the company which is shown to be an average of 33 Months while the Average Monthly Charge is $64.

```
-- Average Tenure in Months and Average Monthly Charges of
customers--
SELECT CEILING(AVG(Tenure_in_Months)) As Average_Tenure_in_Months,
CEILING(AVG(Monthly_Charge)) AS Average_Monthly_Charges
FROM default_schema.churn;
```

Average_Tenure_in_Months	Average_Monthly_Charges
▶ 33	64

4. What is the Typical Tenure for churners?

```
-- Typical tenure for churners
SELECT
    CASE
        WHEN Tenure_in_Months <= 6 THEN '6 months'
        WHEN Tenure_in_Months <= 12 THEN '1 Year'
        WHEN Tenure_in_Months <= 24 THEN '2 Years'
        ELSE '> 2 Years'
    END AS Tenure,
    ROUND(COUNT(Customer_ID) * 100.0 / SUM(COUNT(Customer_ID)) OVER(),1) AS
Churn_Percentage
FROM
default_schema.churn
WHERE
Customer_Status = 'Churned'
GROUP BY
    CASE
        WHEN Tenure_in_Months <= 6 THEN '6 months'
        WHEN Tenure_in_Months <= 12 THEN '1 Year'
        WHEN Tenure_in_Months <= 24 THEN '2 Years'
        ELSE '> 2 Years'
    END
ORDER BY
Churn_Percentage DESC;
```

Tenure	Churn_Percentage
6 months	41.9
> 2 Years	28.8
2 Years	15.7
1 Year	13.5

This shows that the Majority of Churners which is 41.9% were only with the company for 6 Months or less which is way below the average Tenure of 33 Months.

 Almost half of the customers who churned had a relatively short tenure with the company, so there are opportunities for M Telecom to improve customer retention among newer customers.

5. Which cities have the highest churn rate ?

Churn rate measures the percentage of customers who stop using the services of a company over a certain period of time.

```
-- Which cities have the highest churn rates?
SELECT City,
    COUNT(Customer_ID) AS Churned,
    CEILING(COUNT(CASE WHEN Customer_Status = 'Churned' THEN Customer_ID ELSE
NULL END) * 100.0 / COUNT(Customer_ID)) AS Churn_Rate
FROM
    default_schema.churn
GROUP BY
    City
HAVING
    COUNT(Customer_ID)  > 30
AND
    COUNT(CASE WHEN Customer_Status = 'Churned' THEN Customer_ID ELSE NULL
END) > 0
ORDER BY
    Churn_Rate DESC
    LIMIT 4;
```

City	Churned	Churn_Rate
San Diego	285	65
Fallbrook	43	61
Temecula	38	58
Glendale	40	33

These 4 cities have the highest churn rates with San Diego holding a 65% Churn rate which indicates that over half of the San Diego customers have churned.

5. What were the reasons customers left(I.e Churn Reason)?

```
-- Why did customers leave?
SELECT
  Churn_Category,
  ROUND(SUM(Total_Revenue),0)AS Churned_Rev,
  CEILING((COUNT(Customer_ID) * 100.0) / SUM(COUNT(Customer_ID)) OVER()) AS
Churn_Percentage
FROM
  default_schema.churn
WHERE
    Customer_Status = 'Churned'
GROUP BY
  Churn_Category
ORDER BY
  Churn_Percentage DESC;
```

Churn_Category	Churned_Rev	Churn_Percentage
Competitor	1694413	45
Dissatisfaction	617979	18
Attitude	579554	17
Price	438124	12
Other	354389	10

The major reason most customers stated as their reason for leaving was Competitor, which indicates that M telecom has lost almost $1.7 Million in revenue to competitors.

6. More Specific Reason for Customer Churn?

```sql
-- Specific Reason why the customers left?
SELECT Churn_Reason, Churn_Category,
  ROUND(COUNT(Customer_ID) * 100 / SUM(COUNT(Customer_ID)) OVER(), 1) AS
Churn_Percentage
FROM
    default_schema.churn
WHERE
    Customer_Status = 'Churned'
GROUP BY
  Churn_Reason,
  Churn_Category
ORDER BY
  Churn_Percentage DESC
LIMIT 5;
```

Churn_Reason	Churn_Category	Churn_Percentage
Competitor had better devices	Competitor	16.7
Competitor made better offer	Competitor	16.6
Attitude of support person	Attitude	11.8
Don't know	Other	7.0
Competitor offered more data	Competitor	6.3

The More specific reasons for which customers left M telecom for competitors has to do majorly with the competitors having better devices and the competitors making better offers.
This presents an opportunity to M Telecom to work on their devices, offers and training of their support staff.

7. What Promotional offer were Churners on?

```sql
-- What offers did churners have?
SELECT
    Offer,
    ROUND(COUNT(Customer_ID) * 100.0 / SUM(COUNT(Customer_ID)) OVER(), 1) AS
Churn_Percentage
FROM
    default_schema.churn
WHERE
    Customer_Status = 'Churned'
GROUP BY
Offer
ORDER BY
Churn_Percentage DESC;
```

Offer	Churn_Percentage
None	56.2
Offer E	22.8
Offer D	8.6
Offer B	5.4
Offer C	5.1
Offer A	1.9

More than half(56%) of all churners were not on any promotional offer before leaving which could mean they were either not aware of the promotional offers or the offers were not juicy or Mouth watering enough to keep the customers with M telecom.

8. What Internet Type did Churners have?

```
-- What Internet Type did churners have?
SELECT
    Internet_Type,
    COUNT(Customer_ID) AS Churned,
    ROUND(COUNT(Customer_ID) * 100.0 / SUM(COUNT(Customer_ID)) OVER(), 1) AS
Churn_Percentage
FROM
    default_schema.churn
WHERE
    Customer_Status = 'Churned'
GROUP BY
Internet_Type
ORDER BY
Churned DESC;
```

Internet_Type	Churned	Churn_Percentage
Fiber Optic	1236	66.1
DSL	307	16.4
Cable	213	11.4
N/A	113	6.0

66% of Chuners were on the Fiber Optic Internet type.

9. What Internet Type did competitors offer churned customers?

```
-- What Internet Type did 'Competitor' churners have?
SELECT
    Internet_Type,
    Churn_Category,
    ROUND(COUNT(Customer_ID) * 100.0 / SUM(COUNT(Customer_ID)) OVER(), 1) AS
Churn_Percentage
FROM
    default_schema.churn
WHERE
    Customer_Status = 'Churned'
    AND Churn_Category = 'Competitor'
GROUP BY
Internet_Type,
Churn_Category
ORDER BY Churn_Percentage DESC;
```

Internet_Type	Churn_Category	Churn_Percentage
Fiber Optic	Competitor	69.8
DSL	Competitor	14.9
Cable	Competitor	12.7
N/A	Competitor	2.6

70% of Churned customers ended up using Fiber Optic with the competitors which indicates that the Fiber Optic Service and quality in M Telecom needs to be reviewed and improved.

10. Did Churners have premium tech support?

```
-- Did churners have premium tech support?
SELECT
    Premium_Tech_Support,
    COUNT(Customer_ID) AS Churned,
    ROUND(COUNT(Customer_ID) *100.0 / SUM(COUNT(Customer_ID)) OVER(),1) AS
Churn_Percentage
FROM
default_schema.churn
WHERE
    Customer_Status = 'Churned'
GROUP BY Premium_Tech_Support
```

```
ORDER BY Churned DESC;
```

Premium_Tech_Support	Churned	Churn_Percentage
No	1446	77.4
Yes	310	16.6
N/A	113	6.0

More than 77% of churned customers were not able to access proper technical support with reduced wait time. It is possible that with access to this premium technical support, customers could have improved their after-sales experience and reduced churn.

11. What Contract were churners on?

```
-- What contract were churners on?
SELECT
    Contract,
    COUNT(Customer_ID) AS Churned,
    ROUND(COUNT(Customer_ID) * 100.0 / SUM(COUNT(Customer_ID)) OVER(), 1) AS
Churn_Percentage
FROM
    default_schema.churn
WHERE
    Customer_Status = 'Churned'
GROUP BY
    Contract
ORDER BY
    Churned DESC;
```

Contract	Churned	Churn_Percentage
Month-to-Month	1655	88.6
One Year	166	8.9
Two Year	48	2.6

Almost all churned customers (89%) were on the month-to-month contract. Customers on a month-to-month contract are more likely to churn, as they have greater flexibility to cancel or switch providers without incurring any penalty.

12. Which Age bracket did most churners belong to?

```
-- HOW old were churners?
SELECT
    CASE
        WHEN Age <= 30 THEN '19 - 30 yrs'
        WHEN Age <= 40 THEN '31 - 40 yrs'
        WHEN Age <= 50 THEN '41 - 50 yrs'
        WHEN Age <= 60 THEN '51 - 60 yrs'
        ELSE  '> 60 yrs'
    END AS Age,
    ROUND(COUNT(Customer_ID) * 100 / SUM(COUNT(Customer_ID)) OVER(), 1)
AS Churn_Percentage
FROM
    default_schema.churn
WHERE
    Customer_Status = 'Churned'
GROUP BY
    CASE
        WHEN Age <= 30 THEN '19 - 30 yrs'
        WHEN Age <= 40 THEN '31 - 40 yrs'
        WHEN Age <= 50 THEN '41 - 50 yrs'
        WHEN Age <= 60 THEN '51 - 60 yrs'
        ELSE  '> 60 yrs'
    END
ORDER BY
Churn_Percentage DESC;
```

Age	Churn_Percentage
> 60 yrs	32.4
19 - 30 yrs	18.3
51 - 60 yrs	16.5
41 - 50 yrs	16.5
31 - 40 yrs	16.2

32.4% of churners were aged 60 and above.

13. Other Characteristics of Churners
a. Female Customers who churned were slightly higher(50.2%) than male customers.

Gender	Churn_Percentage
Female	50.2
Male	49.8

b. Customers who were without dependents were more likely to churn(94.3 %) than customers with dependents.

Dependents	Churn_Percentage
No Dependents	94.3
Has Dependents	5.7

c. Customers who are unmarried are more likely to churn (64.2%) as opposed Customers who are married.

Married	Churn_Percentage
No	64.2
Yes	35.8

d. There was a higher percentage of churn attributed with customers who used phone service than those without phone service.

Phone_Service	Churned
No	9.1
Yes	90.9

e. The Churn attributed to customers with internet service was higher than those without internet service

Internet_Service	Churned
No	6.0
Yes	94.0

f. 66% of customers who had no referrals churned.

Referrals	Churned
No	66.6
Yes	33.4

14. Key Churn Indicators:
The key churn indicators are therefore:

- Contract: **89%** of churned customers were on the month-to-month contract
- Premium Tech Support: **77%** of churners did not have premium tech support
- Internet Type: **66%** of churners used Fiber Optic internet
- Offer: **56%** of churners did not have any promotional offers, while 23% had Offer E.

15. What amount of High Value customers are susceptible to churn?

```
-- Are high value customers at risk?

SELECT
    CASE
        WHEN (num_conditions >= 3) THEN 'High Risk'
        WHEN num_conditions = 2 THEN 'Medium Risk'
```

```sql
            ELSE 'Low Risk'
    END AS risk_level,
    COUNT(Customer_ID) AS num_customers,
    ROUND(COUNT(Customer_ID) *100.0 / SUM(COUNT(Customer_ID)) OVER(),1) AS
cust_percentage
FROM
    (
    SELECT
        Customer_ID,
        SUM(CASE WHEN Offer = 'Offer E' OR Offer = 'None' THEN 1 ELSE 0 END)+
        SUM(CASE WHEN Contract = 'Month-to-Month' THEN 1 ELSE 0 END) +
        SUM(CASE WHEN Premium_Tech_Support = 'No' THEN 1 ELSE 0 END) +
        SUM(CASE WHEN Internet_Type = 'Fiber Optic' THEN 1 ELSE 0 END) +
        SUM(CASE WHEN Number_of_Referrals >= 1 THEN 1 ELSE 0 END )AS
num_conditions
    FROM
        default_schema.churn
    WHERE
        Monthly_Charge > 64
        AND Customer_Status = 'Stayed'
        AND Number_of_Referrals >= 1
        AND Tenure_in_Months > 6
    GROUP BY
        Customer_ID
    HAVING
        SUM(CASE WHEN Offer = 'Offer E' OR Offer = 'None' THEN 1 ELSE 0 END) +
        SUM(CASE WHEN Contract = 'Month-to-Month' THEN 1 ELSE 0 END) +
        SUM(CASE WHEN Premium_Tech_Support = 'No' THEN 1 ELSE 0 END) +
        SUM(CASE WHEN Internet_Type = 'Fiber Optic' THEN 1 ELSE 0 END)+
        SUM(CASE WHEN Number_of_Referrals >= 1 THEN 1 ELSE 0 END)>= 1
    ) AS subquery
GROUP BY
    CASE
        WHEN (num_conditions >= 3) THEN 'High Risk'
        WHEN num_conditions = 2 THEN 'Medium Risk'
        ELSE 'Low Risk'
    END;
```

risk_level	num_customers	cust_percentage ⌄
High Risk	827	59.8
Medium Risk	403	29.1
Low Risk	154	11.1

I defined high value customers based on the factors below and subsequently grouped them into 3 risk levels (Low, Medium and High):

Tenure: This is a measure of loyalty, so I only considered customers that have been with the company for more than 6 months.

Monthly Charge: Customer's whose total monthly charge is above the average of $64.

Referrals: customers who have referred at least one customer to the business.

High-value customers with 3–4 churn indicators are High Risk, while Medium Risk customers have 2 and Low Risk customers have only 1. For instance, a high-value customer at high risk of churning may use fiber optic, have a month-to-month contract, and no promotional offers or premium tech support.

It was observed that out of 1,384 high value customers who stayed, and based on the key churn indicators/drivers, about **60%** are at **high risk** of churning.

16. Insights

- Maven has 1869 churned customers and 20% of them are high-value customers.
- 42% of churned customers only stayed for 6 months or less.
- The top 3 reasons for churn are competitors made better offers, competitors had better devices and attitude of support staff.
- Maven lost ~$1.7 million to competitors, making it the most expensive type of churn
- The key indicators of churn are Month-to-Month contract , No Premium Tech Support, Fiber Optic internet, No promotional offer and Offer E.
- 70% of customers who churned to competitors used Fiber Optic

- High value customers are churning at a rate of 23%
- Based on the key churn indicators, out of 1250 high-value customers remaining, 77% are at high risk of churning.

17. Customer retention strategy

- **Loyalty Programs:** Since the top reason for churn is 'competitors making better offers' , and more than half of churned customers did not have any promotional offers, M Telecom could implement different loyalty programs to retain their customers. For instance, they could reward customers on long-term contracts with discounted rates, free upgrades, or additional features.
- **Improve Customer Support**: Invest in training and development of support staff to ensure they provide excellent customer service. This could include regular coaching and feedback sessions, as well as incentives for staff who receive positive customer feedback.
- **Make better devices**: Evaluate the features, performance and pricing of your devices to ensure they are in line with market standards and demand.
- **Premium Tech Support**: Since customers who did not have access to premium tech support were more likely to churn, M Telecom should consider offering this service to all customers.
- **Improve Fiber Optic Service:** Invest in improving the Fiber Optic service like faster speeds, more stable connections, and better customer support for Fiber Optic customers especially in San Diego and other cities with very high churn rate.
- **Engage High-Value Customers:** Prioritize engaging these customers to prevent them from leaving. Provide personalized offers, send targeted communications, and provide premium tech support to ensure these customers remain satisfied with their service.
- **After-Sales Service:** Schedule regular check-ins with customers to ensure they are still satisfied with their service. These check-ins

could be in the form of surveys, phone calls, or email communications.

18. **Final Dashboard(Tableau and Figma):**