**Telecom Customer Churn Analysis Report**

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**1. Introduction**

This project is focused on analyzing **customer churn** for a telecom company. The dataset consists of **7,043 customers** and provides detailed information about each customer’s demographics, services, billing preferences, and churn status.

The **objective of this project** was to identify:

* Which customers are churning.
* What factors contribute to customer churn.
* Which patterns differentiate churned customers from retained ones.
* What strategies can be implemented to minimize churn.

For this purpose, we utilized **SQL Server** for structured data handling and cleaning, **Power BI** for data transformation, visualization, and insights generation, along with minor support from **MS Excel** for preliminary checks.

The dataset contained **23 unique attributes** (columns), which required significant cleaning and transformation before they could be effectively analyzed. The ultimate goal was to transform messy and uneven raw data into structured insights through dashboards, KPIs, and meaningful recommendations.

**2. About the Dataset**

The dataset was sourced from **Kaggle** and contains **7,043 rows and 23 columns**. Below are the columns and their meanings:

* **CustomerID** – Unique identifier assigned to each customer.
* **Gender** – Indicates whether the customer is male or female.
* **SeniorCitizen** – Identifies whether the customer is a senior citizen (1 = Yes, 0 = No).
* **Partner** – Indicates if the customer has a partner (Yes/No).
* **Dependents** – Shows whether the customer has dependents (Yes/No).
* **Tenure** – Number of months the customer has been with the company.
* **PhoneService** – States whether the customer has a phone service (Yes/No).
* **MultipleLines** – Shows if the customer uses multiple phone lines (Yes/No/No phone service).
* **InternetService** – Type of internet subscription (DSL, Fiber optic, None).
* **OnlineSecurity** – Whether the customer subscribed to online security (Yes/No/No internet service).
* **OnlineBackup** – Whether the customer opted for online backup services (Yes/No/No internet service).
* **DeviceProtection** – Whether the customer uses device protection (Yes/No/No internet service).
* **TechSupport** – Whether the customer subscribed to technical support (Yes/No/No internet service).
* **StreamingTV** – Whether the customer streams TV using the service (Yes/No/No internet service).
* **StreamingMovies** – Whether the customer streams movies using the service (Yes/No/No internet service).
* **Contract** – Contract type (Month-to-month, One year, Two years).
* **PaperlessBilling** – Whether the customer opted for paperless billing (Yes/No).
* **PaymentMethod** – Mode of payment (Electronic check, Mailed check, Bank transfer, Credit card).
* **MonthlyCharges** – Monthly charges billed to the customer.
* **TotalCharges** – Total charges incurred by the customer over tenure.
* **numAdminTickets** – Number of administrative support tickets raised.
* **numTechTickets** – Number of technical support tickets raised.
* **Churn** – Churn status (Yes = Customer discontinued, No = Active).

**3. SQL Server Implementation**

The first step in this churn analysis project was to load and manage the dataset using **Microsoft SQL Server**. A database system was preferred over Excel due to its scalability, recurring data load support, and ability to maintain data integrity.

Steps performed:

1. **Created a new database** in SQL Server dedicated to churn analysis.
2. **Imported the CSV dataset** into SQL Server using the Import Wizard.
3. Defined **CustomerID as the primary key** and allowed NULL values for all other columns to avoid import errors.
4. Modified data types: converted columns with **BIT data type into VARCHAR(50)**, since the Import Wizard often caused issues with BIT columns.
5. Performed **initial exploratory checks**, such as average monthly charges, customer distribution by gender, and contract type analysis.
6. Checked for missing values (NULLs) and **converted them into appropriate replacements** or excluded where necessary.
7. Created a **clean version of the dataset** and stored it in the newly created database for subsequent analysis.

**4. Power BI Workflow**

Once the dataset was ready in SQL Server, the next phase was conducted in **Power BI**.

**4.1 Data Transformation**

* Imported the cleaned data from SQL Server into Power BI.
* Replaced values such as binary **0/1 into Yes/No** for columns like SeniorCitizen.
* Changed required **data types** for numerical and categorical fields.
* Created **grouped ranges** for columns like Monthly Charges and Tenure to improve visualization.
* **Unpivoted service-related columns** (Online Security, Backup, Protection, etc.) into a structured format to make comparisons easier.

**4.2 Measure Creation**

* Created a new calculation table in Power BI for KPIs and advanced metrics.
* Defined **measures** such as churn rate, total revenue, average monthly charges, churn by service usage, and retention rate.

**4.3 Visualizations & Dashboards**

* Designed two separate dashboards:
  1. **Overall Customer Dashboard** – Showing data of all customers.
  2. **Churned Customer Dashboard** – Focused on customers who have churned.
* Applied slicers for interactivity, allowing analysis by gender, contract type, payment method, etc.
* Designed visuals with consistent formatting (borders, lines, titles, and icons).

**5. Key Calculations & KPIs**

* **Total Customers:** 7,043
* **Churned Customers:** 1,868
* **Churn Percentage:** 26.5%
* **Average Monthly Charges:** $64.8
* **Total Revenue:** $16.1 Million

**6. Detailed Observations**

1. Customers using **Fiber Optic internet** and paying via **Electronic Check** show the **highest churn rate**.
2. The **gender distribution** is almost equal; churn is not significantly influenced by gender.
3. Customers **less likely to churn** include:
   * Those with **dependents**.
   * Those with **partners**.
   * Customers paying through **automatic credit card payments**.
   * Customers on **long-term contracts (one-year and two-year contracts)**.
4. Among churned customers, adoption of **Online Backup, Online Security, Device Protection, and Tech Support** is **very low**, suggesting these services were either undervalued or underutilized.

**7. Recommended Actions to Reduce Churn**

Based on the above observations, the following steps are recommended:

* **Service Quality Improvements**
  + Review service quality issues in **Fiber Optic plans** (speed, downtime, pricing).
  + Introduce **loyalty discounts or bundled offers** (e.g., free add-on services) for fiber optic customers.
* **Payment Method Adjustments**
  + Encourage customers using **Electronic Check** to switch to stable methods such as Auto Bank Transfer or Credit Card Auto-Pay.
  + Provide **incentives** like ₹100 discount, reward points, or cashback for adopting auto-pay.
* **Retention Strategies**
  + Focus on **long-term contracts** by providing discounts and bundled offers for one-year and two-year commitments.
  + Highlight **family-friendly benefits**, such as multi-device access for dependents and partners.
* **Service Adoption Promotion**
  + Launch **awareness campaigns** that explain the value of services like Online Backup, Security, Device Protection, and Tech Support.
  + Provide **free trial periods (1–3 months)** to encourage customer adoption.
  + Bundle these services at **discounted rates** with internet and phone plans.
* **Customer Support Enhancements**
  + Train customer support teams to **proactively upsell retention services** when engaging with at-risk customers.

**8. Conclusion**

The analysis of **7,043 customers** revealed that **26.5% of customers have churned**, with churn concentrated among Fiber Optic users and those using Electronic Check as a payment method. Customers with long-term contracts, dependents, partners, and automatic payment methods tend to stay longer.

Adopting the above recommendations—particularly **improving Fiber Optic services, encouraging auto-pay, promoting value-added services, and pushing long-term contracts**—can significantly lower churn and improve retention, directly impacting revenue growth and customer loyalty.