

E-Shop Pro, a leading e-commerce company, has achieved rapid customer acquisition but is facing **declining retention rates and high churn**. This project applies **time-based cohort analysis** and customer segmentation techniques to uncover insights into customer behavior, identify patterns of churn, and recommend strategies to improve retention and lifetime value.

BUSINESS PROBLEM

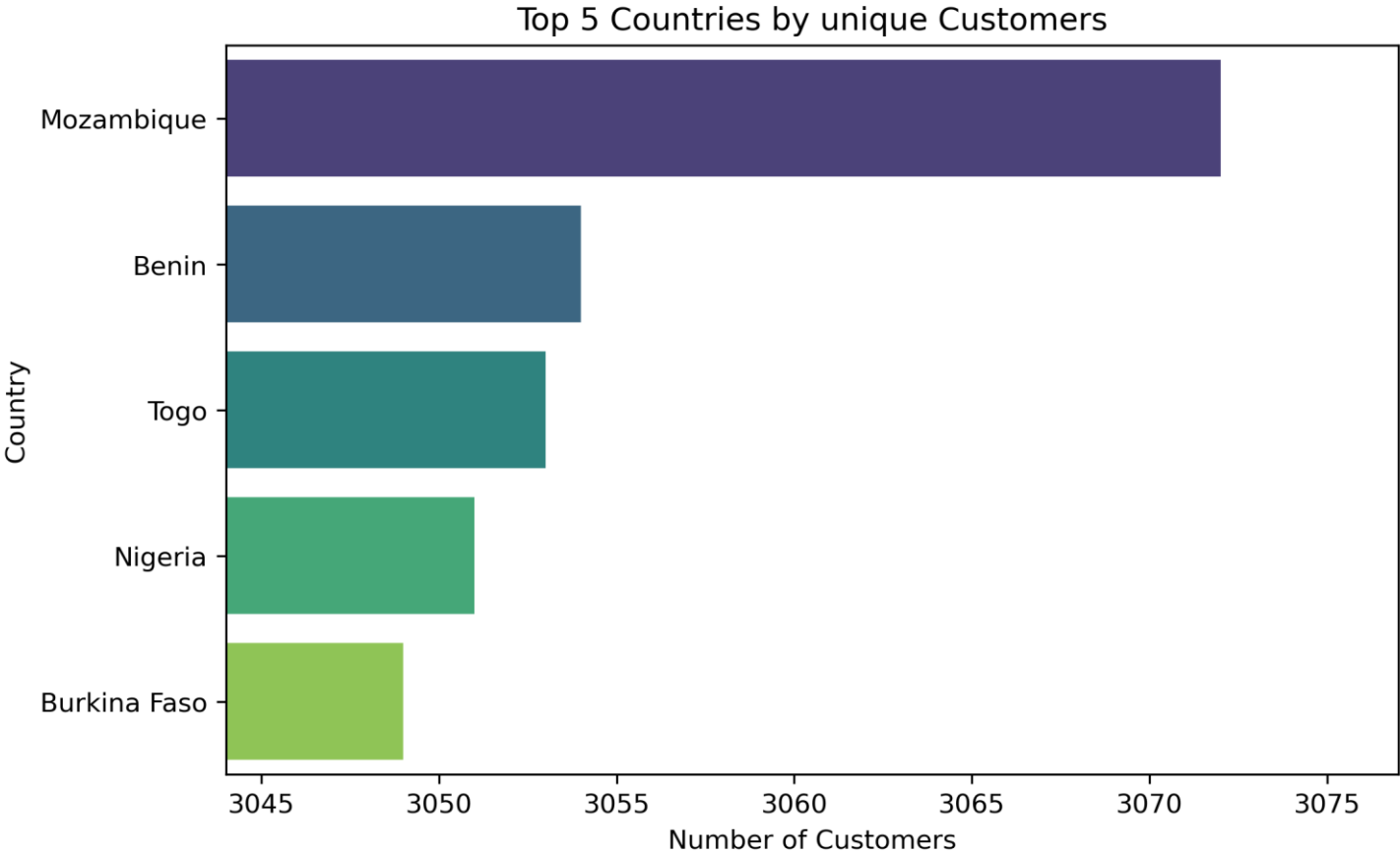
- High first-purchase drop-off: Many new customers fail to return after their initial purchase.
- Customer churn: A significant proportion of customers disengage after a short period, increasing acquisition costs.
- Low engagement: Interaction with the platform decreases after early visits, reducing long-term loyalty.

Methodology

- **Data Cleaning & Preparation** (InvoiceDate, CustomerID, Quantity, Revenue).
- **Exploratory Analysis:** Countries, customers, transactions, and revenue.
- **Cohort Analysis:** Group customers by first purchase month
- **Visualization Tools:** Python (Pandas, Matplotlib, Seaborn).

TOP 5 COUNTRIES WITH THE HIGHEST NUMBER OF UNIQUE CUSTOMERS

THIS COUNTRIES REPRESENT STRONG CUSTOMER BASES AND OPPORTUNITIES FOR TARGETED RETENTION CAMPAIGNS

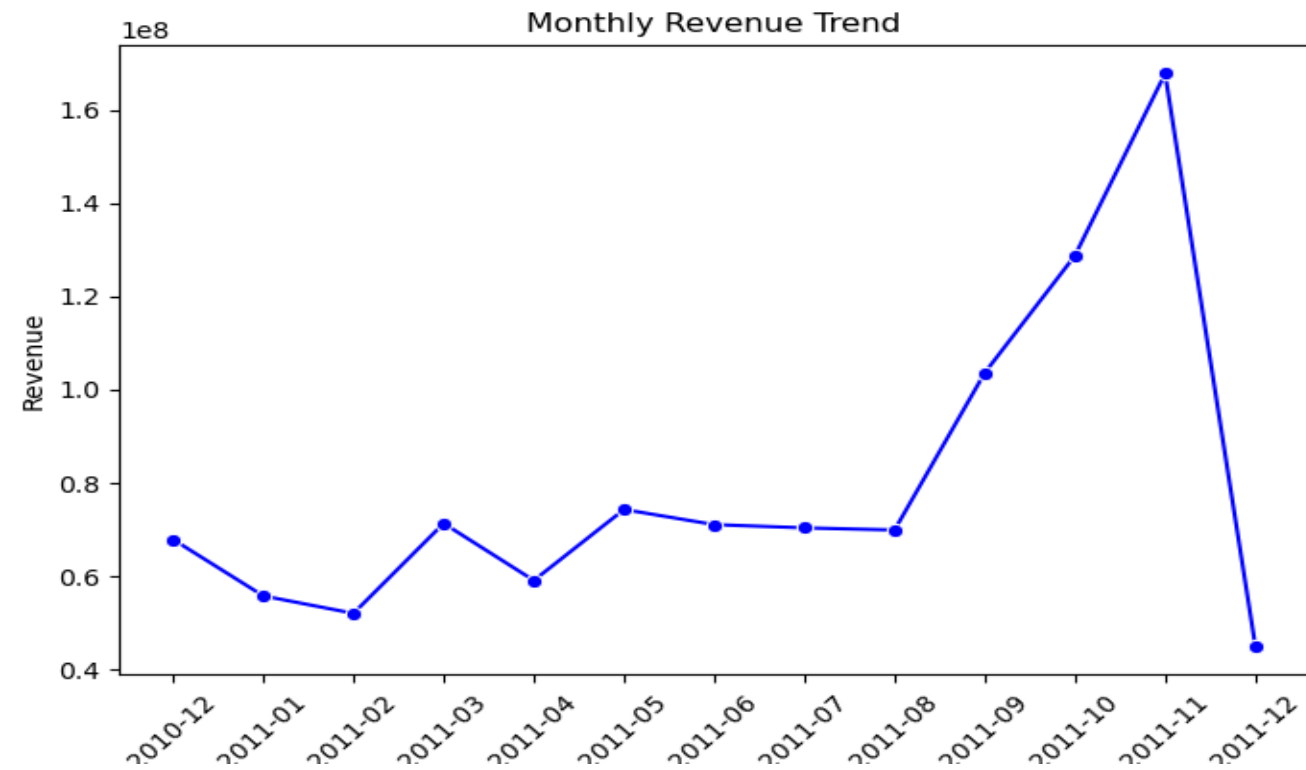


Monthly Revenue Trend

Revenue shows month-to-month fluctuations with a noticeable peak in late 2011.

Indicates possible seasonality in shopping behavior.

Business should plan campaigns around high-demand months to maximize sales.



Cohort Retention Table

Retention is highest in month 1 but declines sharply by month 3.

Example: December 2010 cohort began with 948 customers but only 336 remained after 9 months.

CohortMonth	1	2	3	4	5	6	7	8	9
2010-12-01 00:00:00	948	362	317	367	341	376	360	336	336
2011-01-01 00:00:00	421	101	119	102	138	126	110	108	131
2011-02-01 00:00:00	380	94	73	106	102	94	97	107	98
2011-03-01 00:00:00	440	84	112	96	102	78	116	105	127
2011-04-01 00:00:00	299	68	66	63	62	71	69	78	25
2011-05-01 00:00:00	279	66	48	48	60	68	74	29	
2011-06-01 00:00:00	235	49	44	64	58	79	24		
2011-07-01 00:00:00	191	40	39	44	52	22			
2011-08-01 00:00:00	167	42	42	42	23				
2011-09-01 00:00:00	298	89	97	36					
2011-10-01 00:00:00	352	93	46						