Data Analytics Capstone Project

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Problem Statement / Objective

01

Problem Statement

A third-party travel insurance servicing company that is based in Singapore needs data-driven insights to optimize policy offerings, assess claim patterns, and enhance customer segmentation.

However, understanding key factors influencing claims, sales performance, and commission structures requires thorough analysis.

Objective

The objective of this analysis is to derive actionable insights by:

- *Identifying Key Claim Patterns*
- *Evaluating Sales and Commission Trends*
- *Segmenting Customer Profiles*
- *Providing Business Recommendations*

Data Source and Data Dictionary

02

Data Source and Data Dictionary

The dataset was downloaded from *https://www.kaggle.com/datasets/mhdzahier/travel-insurance*
The original dataset has 11 columns with 'Claim' being the target variable and 63,326 insurance records.

Agency ***String***	Name of agency.
Agency Type ***String***	Type of travel insurance agency. (Airlines, Travel Agency)
Distribution Channel ***String***	Distribution channel of travel insurance agency. (Offline, Online)
Product Name ***String***	Name of the travel insurance product.
Claim ***String***	Claim status. (No, Yes)
Duration ***Number (Whole)***	Duration of travel.

Destination ***String***	Destination of travel.
Net Sales ***Number (Decimal)***	Amount of sales of travel insurance policy.
Commision (in value) ***Number (Decimal)***	Commission received for travel insurance agency.
Gender ***String***	Gender of insured. (F, M)
Age ***Number (Whole)***	Age of insured.

Data Source and Data Dictionary

Understanding Travel Insurance Products

Comprehensive Plans	*1 Way Comprehensive Plan, 2 Way Comprehensive Plan, Individual Comprehensive Plan, Spouse or Parents Comprehensive Plan, Child Comprehensive Plan*	These plans provide broad coverage for medical emergencies, trip cancellations, lost baggage, and other travel-related risks. The "1 Way" and "2 Way" distinctions may refer to coverage for one-way vs. round-trip travel.
Annual Travel Insurance Plans	*Annual Gold Plan, Annual Silver Plan, Annual Travel Protect Gold, Annual Travel Protect Silver, Annual Travel Protect Platinum*	Designed for frequent travelers, these plans provide year-round coverage, often with different tiers (Gold, Silver, Platinum) indicating varying levels of protection.
Single Trip Travel Insurance Plans	*Single Trip Travel Protect Gold, Single Trip Travel Protect Silver, Single Trip Travel Protect Platinum*	Offer coverage for a single journey, with different levels of protection. Typically includes medical expenses, trip cancellations, and baggage loss.
Basic & Value Plans	*Basic Plan, Value Plan*	These provide essential coverage at a lower cost, typically including medical emergencies and trip interruptions but with fewer benefits than comprehensive plans.
Premium Plans	*Gold Plan, Silver Plan, Bronze Plan, Premier Plan*	These plans offer tiered benefits, with "Gold" plans typically providing the highest coverage and "Bronze" offering the most basic protection.

Data Source and Data Dictionary

Understanding Travel Insurance Products

Cancellation & Ticket Protection	*Cancellation Plan, Ticket Protector*	Specifically designed to reimburse non-refundable trip costs if a traveler cancels for covered reasons (e.g., illness, emergencies).
Rental Vehicle Excess Insurance	*Rental Vehicle Excess Insurance*	Covers the deductible or excess amount for rental car insurance in case of an accident or damage.
Cruise Travel Insurance	*Travel Cruise Protect, Travel Cruise Protect Family*	Tailored for cruise vacations, these plans cover medical emergencies at sea, missed port departures, and trip cancellations. The "Family" version likely includes coverage for multiple travelers under one policy.
24-Hour Protection Plans	*24 Protect*	Likely provides round-the-clock travel protection, covering emergency medical situations, accidents, and assistance services.

Data Processing / Cleaning Steps

03

Extract Transform Load

1. Extract

The raw dataset was downloaded from: *https://www.kaggle.com/datasets/mhdzahier/travel-insurance*

2. Transform

- Data Preparation: Duplicates were checked, and no row duplicates were found. The gender column (71% missing values) was removed. Column names were standardized (spaces replaced with underscores), spelling errors corrected (e.g., "Commision" → "Commission", "Viet Nam" → "Vietnam"), and invalid records were removed (negative duration and values above 4000).
- Data Cleaning & Standardization: Formats and units were standardized, and data types were corrected for consistency. No calculated or derived fields were found, ensuring that all data was accurate and analysis-ready.

3. Load

The cleaned data was stored and was accessible for querying, analysis, and visualization with Tableau.

Cleaned Data Source and Data Dictionary

The dataset has been cleaned and prepared for analysis, consisting of 10 columns and 63,307 insurance records, with "Claim" as the target variable.

Agency ***String***	Name of agency.
Agency_Type ***String***	Type of travel insurance agency. (Airlines, Travel Agency)
Distribution_Channel ***String***	Distribution channel of travel insurance agency. (Offline, Online)
Product_Name ***String***	Name of the travel insurance product.
Claim ***String***	Claim status. (No, Yes)

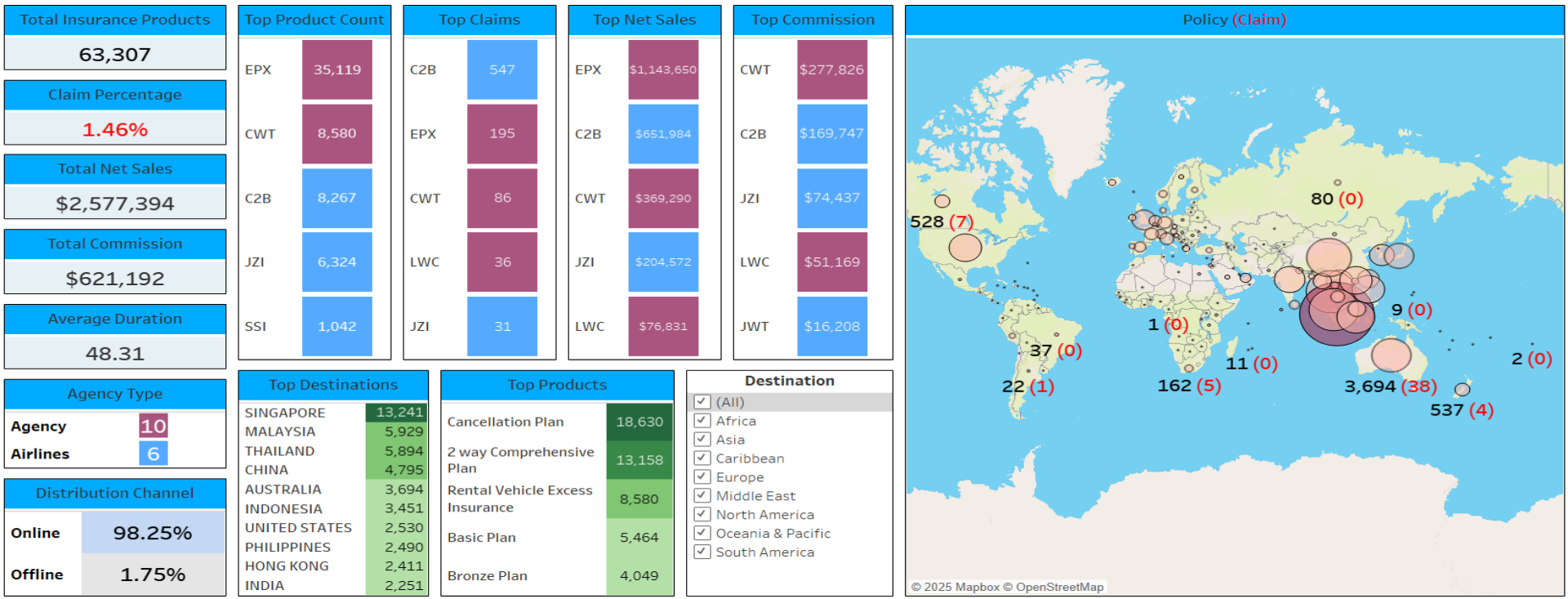
Duration ***Number (Whole)***	Duration of travel.
Destination ***String***	Destination of travel.
Net_Sales ***Number (Decimal)***	Amount of sales of travel insurance policy.
Commission ***Number (Decimal)***	Commission received for travel insurance agency.
Age ***Number (Whole)***	Age of insured.

Link to Tableau Public

Data Analysis

Visualisation, Trends and Insights

04



Asia leads in policy and claim concentration, with Singapore at the top.

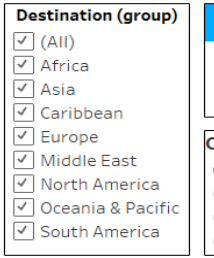
Online sales dominate, while offline sales contribute minimally.

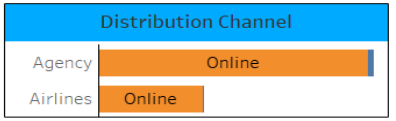
Claims remain low.

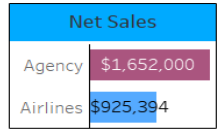
EPX sells most insurance products with no commission.

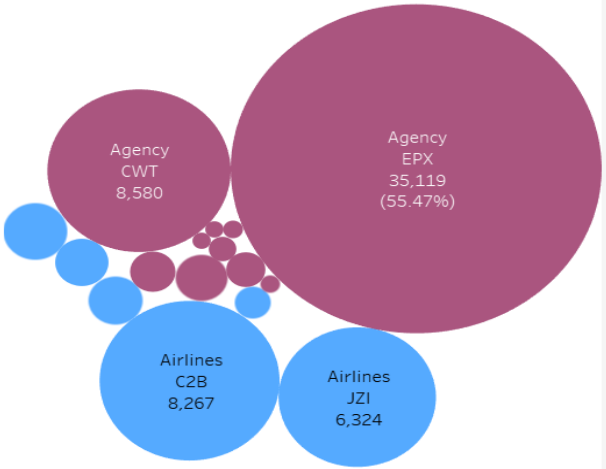
High-demand products include Cancellation Plans and 2-Way Comprehensive Plans.

Regional variations show some destinations with higher policy purchases and claims.





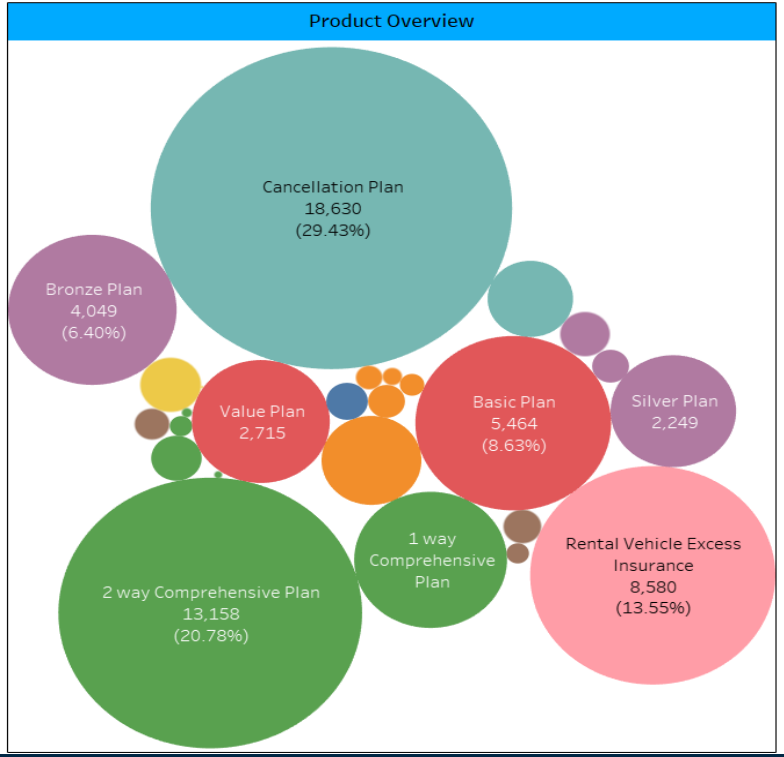


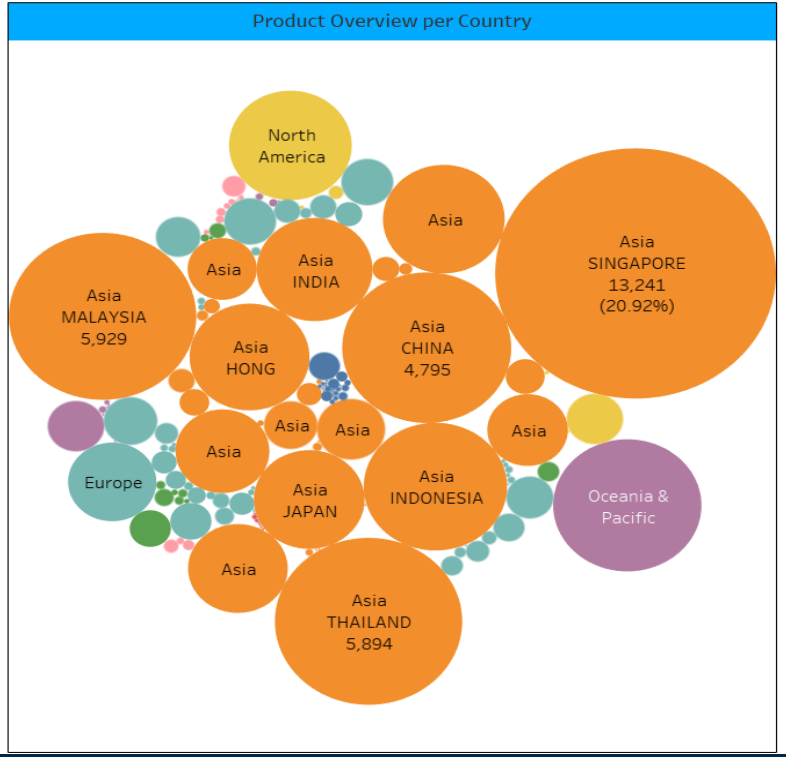


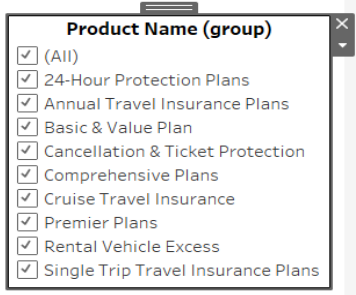
Travel agencies drive most net sales, with EPX selling over 55% of policies.

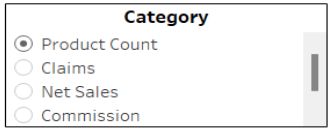
Apart from a few key plans, most are exclusive to specific agencies or airlines, indicating specialization in insurance offerings.

C2B airlines contribute 59% of overall claims through Annual Travel and Premier Plans, while CWT accounts for 45% of total commission from Rental Vehicle Excess Insurance.







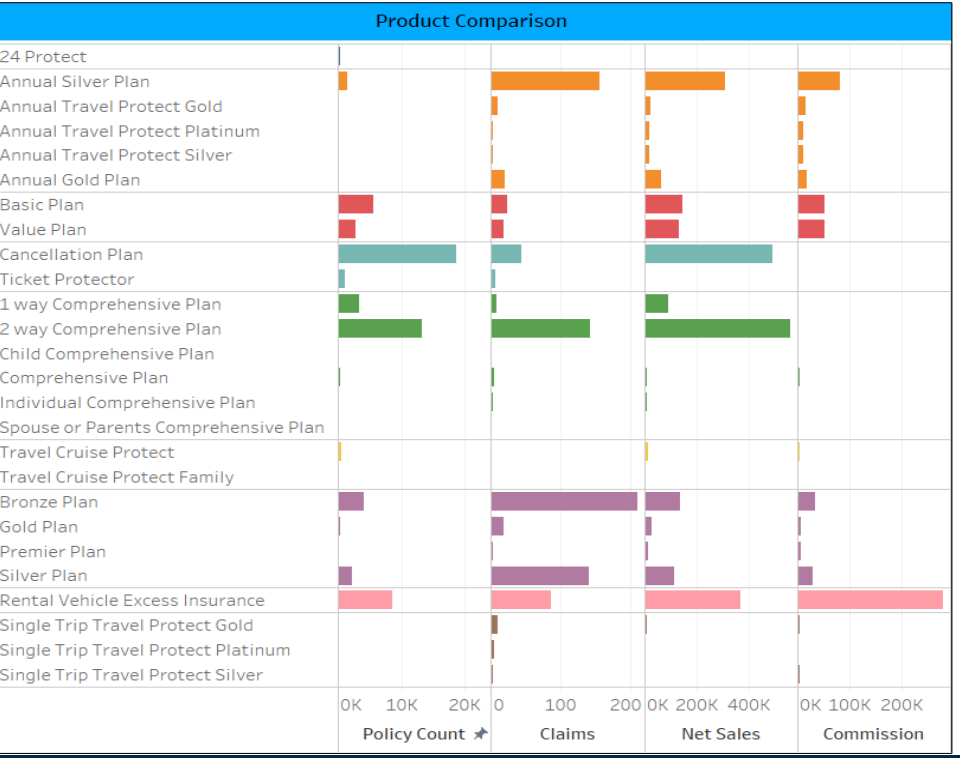


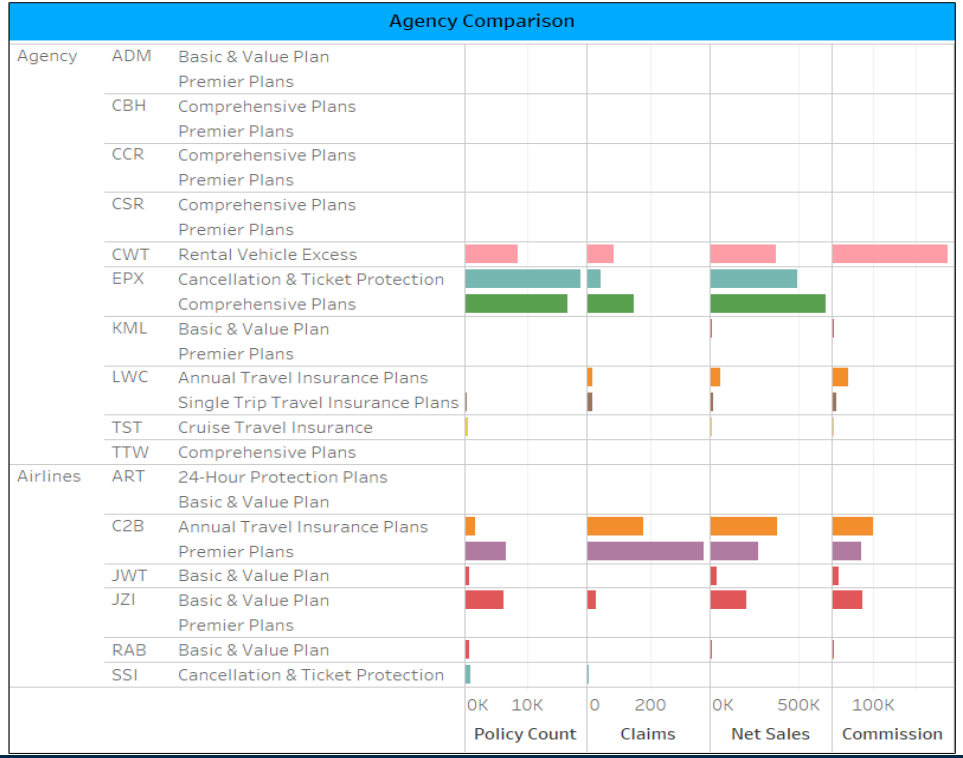
The Cancellation Plan (29%), 2-Way Comprehensive Plan (21%), and Rental Vehicle Excess Insurance (14%) are the most in-demand products.

Asian destinations drive demand for the first two, while Australia (29%) and Malaysia (17%) lead in Rental Vehicle Excess Insurance.

The Bronze Plan (23%) and Annual Silver Plan (17%) account for 40% of claims, mainly in Singapore.

The 2-Way Comprehensive Plan (22%) leads in net sales.





The data highlights product performance variations and agency specialization, with high policy counts driving revenue and claim trends affecting risk.

EPX and CWT lead in sales and commissions, likely due to strong partnerships or online strategies.

Cancellation Plan drives revenue, while Rental Vehicle Excess Insurance profits from fees.

Most claims come from Airlines C2B offering Annual Travel and Premier Plans.

Recommendations / Limitations and Conclusion

05

Data Set Limitations

Data Integrity:

- Missing Gender Data (71%). Efforts are needed to collect gender data during entry for customer segmentation.
- Age Outliers. Correct unrealistic age values to prevent segmentation issues.
- Negative & Zero Durations. Validate and correct policy durations to reflect actual values.
- Negative Net Sales. Clarify the cause of negative net sales, e.g., refunds, or data entry errors.

Lack of claim details:

- The dataset only shows if a claim was made, missing details like claim type, amount, frequency and reason.

Lack of customer demographics:

- Missing customer information (location, travel frequency) limits segmentation and targeted marketing strategies.

Conclusion

1. **Identifying Key Claim Patterns:**
   - 📌 Low Claim Rate (1.46%): Most policies go unused, but some products have higher claim volumes. Analyzing claims can help optimize underwriting.
   - 📌 High Claim Ratios: Riskier destinations and certain products show higher claim frequencies, with trip duration linked to claims.

2. **Evaluating Sales and Commission Trends:**
   - 📌 Online Sales Dominance (98.25%): Online channels derive most sales, with a few products generating significant revenue. Certain agencies lead in sales volume.
   - 📌 Commission Variation: Some products (e.g., Rental Vehicle Excess Insurance) generate high commissions despite low sales.

3. **Segmenting Customer Profiles:**
   - 📌 Lack of Demographics: Missing age and gender (71% gap) limits targeted marketing campaign creation.

Recommendations

1. **Identifying Key Claim Patterns:**
   - ✅ Analyze Claim Reasons: Collect detailed claim data to identify patterns.
   - ✅ Adjust Pricing for High-Claim Products: Increase premiums or introduce tiered pricing for gigh-claim products.
   - ✅ Adjust Pricing for High-Claim Destinations: Offer specialized plans for riskier destinations.

2. **Evaluating Sales and Commission Trends:**
   - ✅ Optimize Product Pricing: Adjust pricing and commission structures based on product profitability.
   - ✅ Incentivize High-Performing Agents: Offer bonuses for agencies selling high-margin products.
   - ✅ Focus Marketing on High-Revenue Products: Strengthen agency partnerships and invest in online sales channels.

3. **Segmenting Customer Profiles:**
   - ✅ Enhance Data Collection: Collect gender and age verification during purchase.
   - ✅ Develop Age-Based Plans: Offer tailored plans for younger and older travelers.
   - ✅ Analyze Repeat Customers: Reward loyal customers with discounts or customized plans.