Turtle Games: Predicting Future Outcomes

Context and Approach

Turtle Games is a fictional game manufacturer and retailer specialising in books, board games, video games, and toys. The company seeks to enhance overall sales performance through comprehensive analysis of customer trends and purchasing behaviours. To support this objective, Turtle Games developed an initial set of research questions which I subsequently restructured to improve analytical clarity and facilitate the generation of higher-quality business insights.

Analytical Questions

Can distinct customer segments be identified using clustering techniques based on behavioral and demographic variables?

What distinguishing characteristics define each identified customer segment?

Can customer engagement be measured within each segment by analysing loyalty point accrual, identifying the most and least engaged groups?

Can a statistically sound predictive model be developed to forecast loyalty point accrual using key behavioral and demographic features?

How can natural language or text analysis techniques be used to identify measurable behavioral patterns that contribute to loyalty point accumulation?

1. Preliminary Steps

1a. Load Packages

```python
import pandas as pd
import numpy as np
import seaborn as sns
import matplotlib.pyplot as plt
import statsmodels.api as sm
import statsmodels.stats.api as sms # enables Breusch-Pagan Test
from statsmodels.formula.api import ols #enables ordinary least squares method
import sklearn
from sklearn import linear_model
```