University of California, Irvine, Paul Merage School of Business

Master of Science in Business Analytics

- **Class Name:** Foundations of Business Analytics

- **Report Title:** Marketing Insights to Different Customer Segments for Sun Country

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1. Introduction

1.1 Business objectives

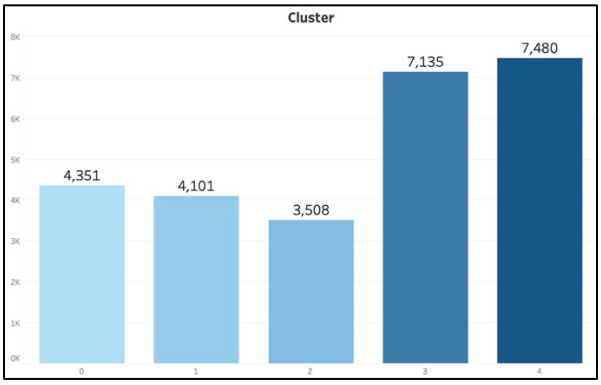
Sun Country Airlines, a regional carrier, is at a pivotal stage in its development, where strategic use of technology and customer data will play a critical role in shaping its future. Therefore, Warnken, Sun Country's manager, recognizing the limitations of competing solely on price against larger carriers, emphasizes the need for a deeper understanding of customer preferences. His vision is to create unique value propositions, such as vacation packages, that appeal to customers and are difficult for competitors to replicate. The other manager, Vaughan, she highlights the need to align the online booking channels with the expectations of modern travelers while also driving engagement in the airline's loyalty program, Ufly Rewards. She aims to refine their digital platforms, making them more user-centric and effective in converting frequent travelers into loyal members.

1.2 Description of dataset and methods

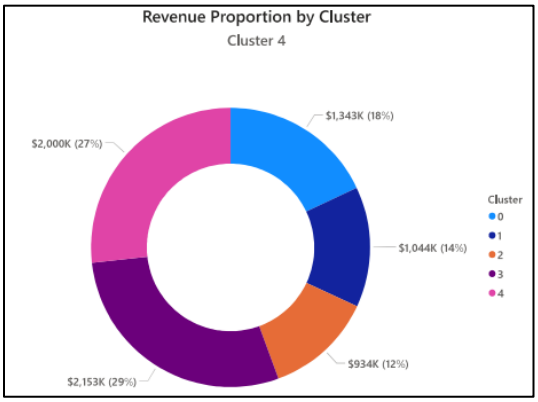
The existing data was from January 2013 to December 2014, including Ufly Reward program database, TSA (Transportation Security Administration) flight records, transaction-level data, etc. There were 37 columns and 26575 rows, which is enough to conduct our analysis with higher accuracy. The methods we use are Cluster Analysis with K-means and Visualization with Excel, Python and Power BI. Cluster Analysis can help to cluster customers into different groups with similarities, so that we can develop insights to specific market segments, through which we can achieve Precision Marketing. Visualization can be a direct way with charts or graphs to help analysts to describe and compare segments, getting marketing recommendations or insights.

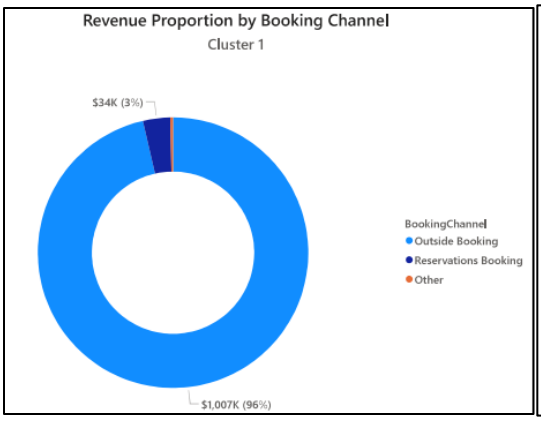
2. Analysis and Visualization

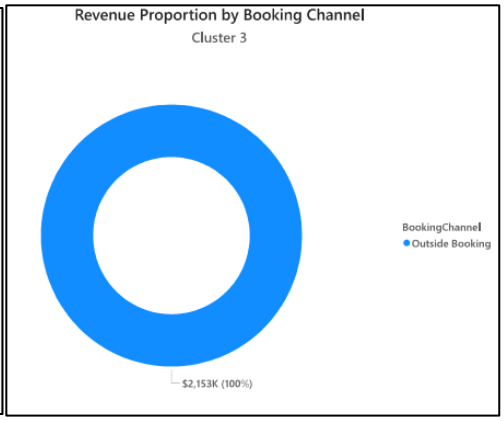
In this section, we examined Sun Country Airlines' marketing strategies for five customer segments, focusing on **'Booking Channel'**, **'Ufly Rewards'** and **'Trip Destination'**. Here are our cluster results with most customers in cluster 4 and least customers in cluster 3.



2.1. Booking channel







Analysis:

The revenue proportion by booking channel indicates that customers from Clusters 1 and 3 have primarily used external channels for ticket bookings.

Conclusion:

To enhance the company's e-commerce initiatives, it is advisable to target these clusters.

2.2. Ufly Rewards

○ 2.2.1 Enhancing Ufly Membership in the Minneapolis-St. Paul Area

Analysis:

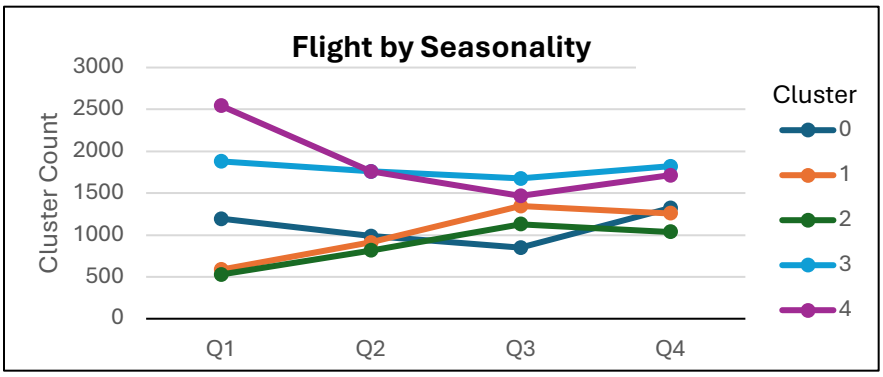
One of the objectives of Sun Country Airlines is to increase Ufly membership in the Minneapolis-St. Paul metro area. Analysis shows that Clusters 3 and 4 have a large number of non-members, mainly from Minneapolis, indicating the need to expand program advertising. Currently, only about one-quarter of customers in the MSP area are rewards members. Clusters 1 and 2 consist of customers from other areas, primarily from JFK, and do not include any MSP customers.

Conclusion:

Given the segmented customer groups, Sun Country Airlines should prioritize converting non-Ufly customers in Clusters 3 and 4, which offer the most potential for increasing membership in the MSP area. Clusters 1 and 2, with fewer than

1,000 customers combined and located primarily outside MSP, should be lower priorities. Expanding the rewards program in the MSP area remains crucial due to the large number of potential customers.

- **2.2.2 Seasonal Promotion Strategy**



Analysis:

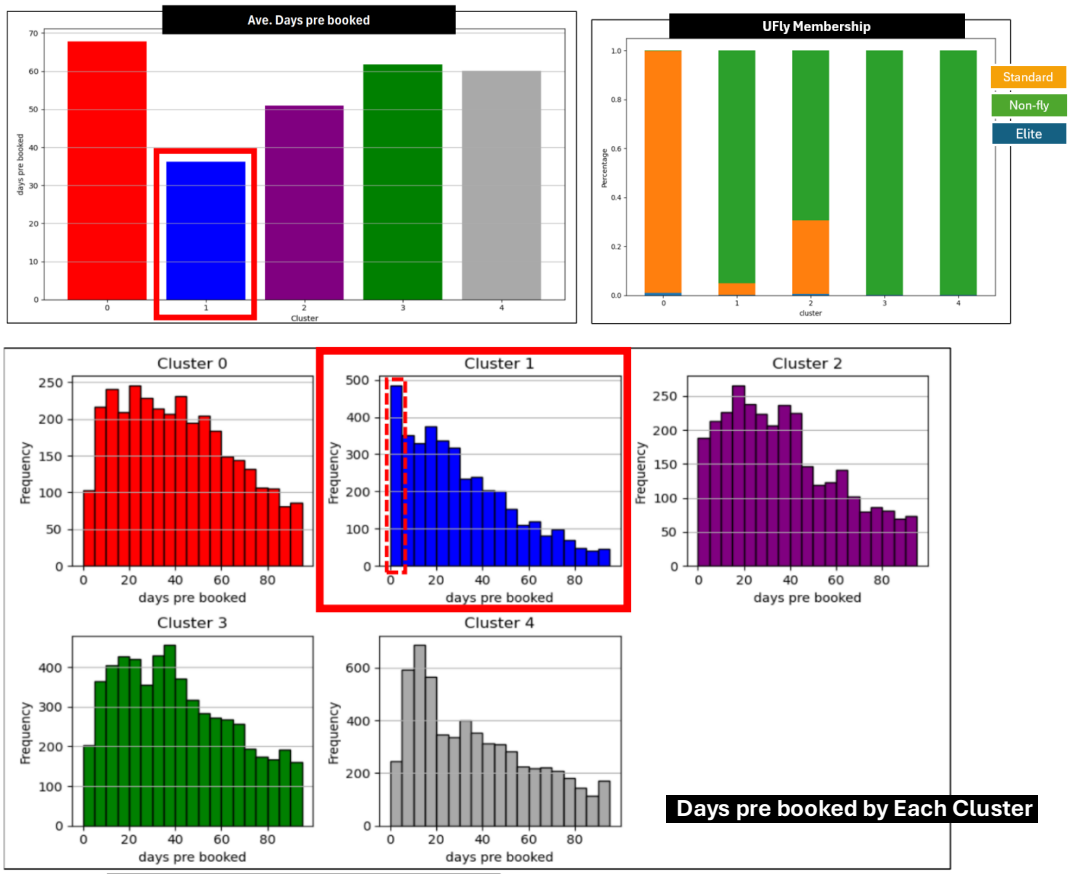
- Q1: Cluster 4 (purple) shows the highest counts, particularly in Q1, highlighting this quarter as a period of heightened activity for these clusters.
- Q2: Cluster counts generally decrease in Q2, except for a slight increase in Cluster 1 (orange) and Cluster 2 (green), suggesting a period of moderation for most clusters.
- Q3: Cluster 1 and Cluster 2 grow in Q3, becoming the most active, while Cluster 0 (teal), Cluster 3 (light blue), and Cluster 4 continue to decline.
- Q4: Cluster 1 and Cluster 2 decline in Q4, but Clusters 0, 3, and 4 show a notable recovery.

Conclusion:

Q1 is the best time for Sun Country Airlines to target Clusters 0, 3, and 4 with promotions, as these clusters show peak activity. For Clusters 1 and 2, Q3 is ideal for promotions, given the high engagement during this quarter. Aligning marketing

efforts with these seasonal trends can optimize promotion effectiveness and boost customer engagement.

- **2.2.3 Booking Timing**



Analysis:

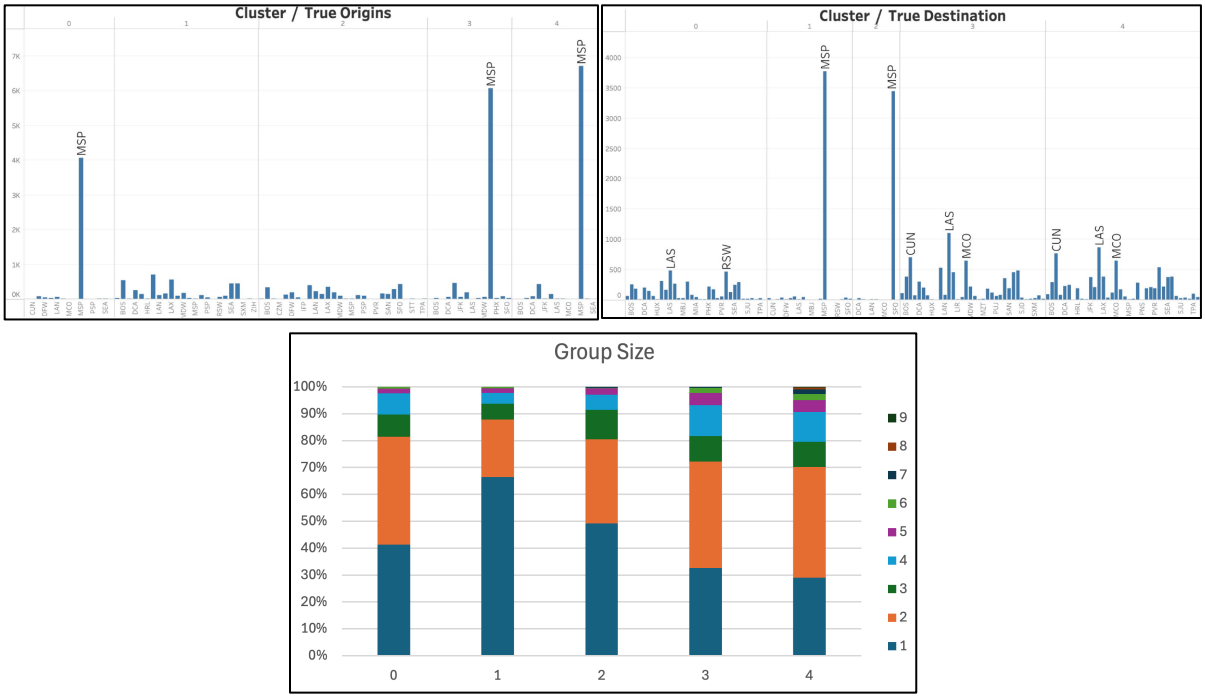
Based on the bar charts and histogram, it is evident that customers in Cluster 1 tend to book their flights at the last minute. Additionally, a lower proportion of these customers hold a membership.

Conclusion:

Targeting Cluster 1 with offers for unsold seats can help optimize occupancy, maximize revenue, and reduce opportunity costs. Encouraging them to join the U fly membership program could also boost loyalty since majority of them are not in

the membership program. Their preference for the airline under time pressure shows trust, which can be leveraged to drive repeat bookings.

2.3 Trip Destination



Analysis:

Sun Country Airlines may benefit more from developing unique trip plans than competing on price with dominant companies. The stacked bar chart shows that one-person groups are less than 50% of Clusters 0, 3, and 4, but over 50% in Clusters 1 and 2. Bar charts for true_origin and true_destination reveal that Clusters 1 and 2 often start from various locations and end at MSP, while Clusters 1, 3, and 4 generally begin at MSP and end at LAS, RSW (Cluster 1), CUN, and MCO (Clusters 3 and 4).

Conclusion:

To attract more customers in Clusters 0, 3, and 4, Sun Country could offer multi-person tickets along with coupons of attractions in MSP, RSW, CUN and MCO. For Clusters 1 and 2, single customer can receive coupons of famous sites at MSP, when purchasing their

tickets. With coupons, customers will put Sun Country at first place when traveling around MSP, RSW, etc.

3. Features of Each Cluster

In this section, we will outline strategies for approaching each cluster group by identifying and targeting their specific characteristics.

3.1 Cluster #0: "Exclusive Membership Holders"

[Description]

Retired people who love planning their trips beforehand, traveling to various places in New Year's Holidays and care about the comfort of their seats.

[Key Characteristics]

- Age: They have the highest average age at around 47.3.
- True Original: 93.47% of them take off at MSP airport.
- Seasonality: They tend to fly in Q4 and Q1, which might be the New Year's Holidays.
- Member Status: 98.91% of them are Standard member, and 1.06% of them are Elite.
- Days pre book: With 68 days of average and 707 days max before the trips.
- Booking Channel: 66.8% of them book flights through SCA Website Booking.
- Card Holder: Cluster 0 has the highest rate (5%) of cardholders among all clusters.

[Strategy]

The company could introduce a new product package including free shuttle service between the terminals and other airport areas, targeting specific age groups. Additionally, they could partner with credit card companies for promotions and sell tickets for flights from MSP airport through the SCA website before New Year’s Holidays.

3.2 Cluster #1: "Last-Minute Flyers: Non-Ufly Members Booking from Outside"

[Description]

Last minute non Ufly Members who tend to fly during the last half of the year, from Outside booking.

[Key Characteristics]

- Booking Channel: Outside Booking
- True origin: Most fly from JFK
- Number of groups: 66.4% of the groups consist of single travelers.
- Member Status: Majority are non Ufly Members
- Days pre book: Many customers like to wait last minute to book their flights

[Strategy]

Promotions for last-minute deals can be targeted to persuade customers to become members after experiencing personalized offers. Mainly business use and streamlining the booking process to be quicker and easier can help retain these last-minute customers.

3.3 Cluster #2: "Cost-Conscious Late Bookers: 25+ Booking via SCA Website in Q3"

[Description]

The cluster with the fewest data points includes both members and non-members, mainly customers aged 25 and older. They book through the SCA Website mainly in the third quarter. While seat comfort isn't a priority, they often face higher costs due to last-minute bookings.

[Key Characteristics]

- Age: They have the average age of 39.72
- True destination: 98% of the trip is to MSP
- Seasonality: They tend to fly in Q3 and Q4

- Member Status: 69% non-members, 29.99% standard and 0.6% Elite members
- Days pre book: With 51 days of average and maximum 456 days before the trips

[Strategy]

The company should focus on customers above 25 to promote the membership along with the Ufly rewards. During Q3 and Q4 they can offer additional discounts for the flights from MSP, with special discount on first class and discount first class and round trip.

3.4 Cluster #3: "Price-Sensitive Minneapolis Families: Vacationing in Major”

[Description]

Customers in their 40s, usually traveling with a partner or family, live in the Minneapolis area. Their trips are mainly for vacations to destinations like Las Vegas, major West Coast cities (Los Angeles, San Francisco, Seattle), and resort spots like Florida and Cancun, Mexico. They are price-sensitive and typically fly coach.

[Key Characteristics]

- Age: They are around the age of 40s.
- Original destination:85% of them take off at MSP airport.
- Seasonality: They have a stable travel tendency throughout the year.
- Member Status: Almost 100% of them are non-fly members

[Strategy]

Offering family-oriented travel packages, such as family discounts, free extra luggage, or bundled deals to specific destinations, can boost satisfaction and retention. Additionally, partnering with hotels, resorts, or attractions in popular destinations like Las Vegas can add value. Discounts on accommodations or local experiences when booking flights could increase loyalty and make the airline more appealing for family trips. Enhancing the loyalty

program with more generous point-earning opportunities could also be effective, especially since few in this group are currently members.

3.5 Cluster #4: "Early-Year MSP Departures: Non-Ufly Members Booking with Friends or Family"

[Description]

Non-ufly members tend to start their trip at MSP at the first quarter of the year, with friends or families, booking their tickets 2 months before the trip from SCA website.

[Key Characteristics]

- Booking channel: 73% of them book tickets at SCA Website.
- Member Status: 99.9% of them are non-ufly and 0.1% of them are Elit.
- Trip Destination: Most of them start their trip at MSP and end at LAS, CUN
- Group Size: Over 50% of them are multi-person groups.
- Seasonality: Most of them fly in the first quarter of year.
- Days pre booked: They tend to book tickets 60 days before trips.

[Strategy]

The company should convert non-ufly customers to other member status and put more advertisements on the SCA Website at the first quarter of the year. Sun Country can offer multi-person tickets along with coupons at MSP, RSW, CUN and MCO.

- **Appendix (Code we used)**

INITIAL CLUSTERING

Data Import

```
[ ] from google.colab import drive
    drive.mount('/content/drive')
```

```
Mounted at /content/drive
```

```
[ ] clustering_data = pd.read_csv('/content/drive/MyDrive/Clustering_Data.csv')
    clustering_data.head(3)
```

	uid	PNRLocatorID	avg_amt	round_trip	group_size	group
0	5045544552446964204 93F7C2067657420746869732072...	AADMLF	0.019524	0	0.000	0
1	46495853454E44696420493F7C20676574207468697320...	AAFBOM	0.081774	1	0.000	0
2	5343555454446964204 93F7C2067657420746869732072...	AAFILI	0.026650	0	0.125	1

3 rows × 90 columns

```
[ ] # Rows and Columns
    print(f'Rows: ',clustering_data.shape[0])
    print(f'Columns: ',clustering_data.shape[1])
```

```
Rows:  15144
Columns:  90
```

K-Means Clustering

```
[ ] from sklearn.cluster import KMeans
```

```
[ ] # Drop columns that don't affect clustering
    copy1 = clustering_data.copy()
    copy1.drop([['uid'],['PNRLocatorID']],axis = 1,inplace=True)
```

```
[ ] # Import kmeans and fit data
    kmeans = KMeans(n_clusters=5,n_init=33)
    kmeans.fit(copy1)
```

```
[ ] # Assign cluster labels to original dataframe
    clustering_data['cluster'] = kmeans.labels_
    clustering_data.cluster.value_counts()
```

cluster	count
4	7480
3	7135
0	4351
1	4101
2	3508

dtype: int64

```
[ ] # Reorder Clusters
    num_cluster = clustering_data.cluster.nunique()

    for i in range(num_cluster):
      print(f'Size of Cluster {i}: {clustering_data[clustering_data.cluster == i].shape[0]}')
```

```
Size of Cluster 0: 4351
Size of Cluster 1: 4101
Size of Cluster 2: 3508
Size of Cluster 3: 7135
Size of Cluster 4: 7480
```

Left Join Data and Cluster

```
[ ] cust_data = pd.read_csv('/content/drive/MyDrive/Sample_Data.csv',low_memory=False)
    cust_data.head(3)
```

	Unnamed: 0	PNRLocatorID	PaxName	TicketNum	CouponSeqNbr	ServiceStartCity	ServiceEndCity	PNRCrea
0	1	AADMLF	PETEJO	3.377490e+12	1	MSP	DFW	
1	2	AAFBOM	FIXSMO	3.372110e+12	2	JFK	MSP	
2	3	AAFBOM	FIXSMO	3.372110e+12	1	MSP	JFK	

3 rows × 37 columns

```
[ ] # Join cluster labels onto sample customer data
    final_df = cust_data.merge(clustering_data[['uid','cluster']],how='left',on='uid')
```

```
[ ] # final_df.to_csv('final_df.csv')
```