Clustering & Association Rule Mining Report
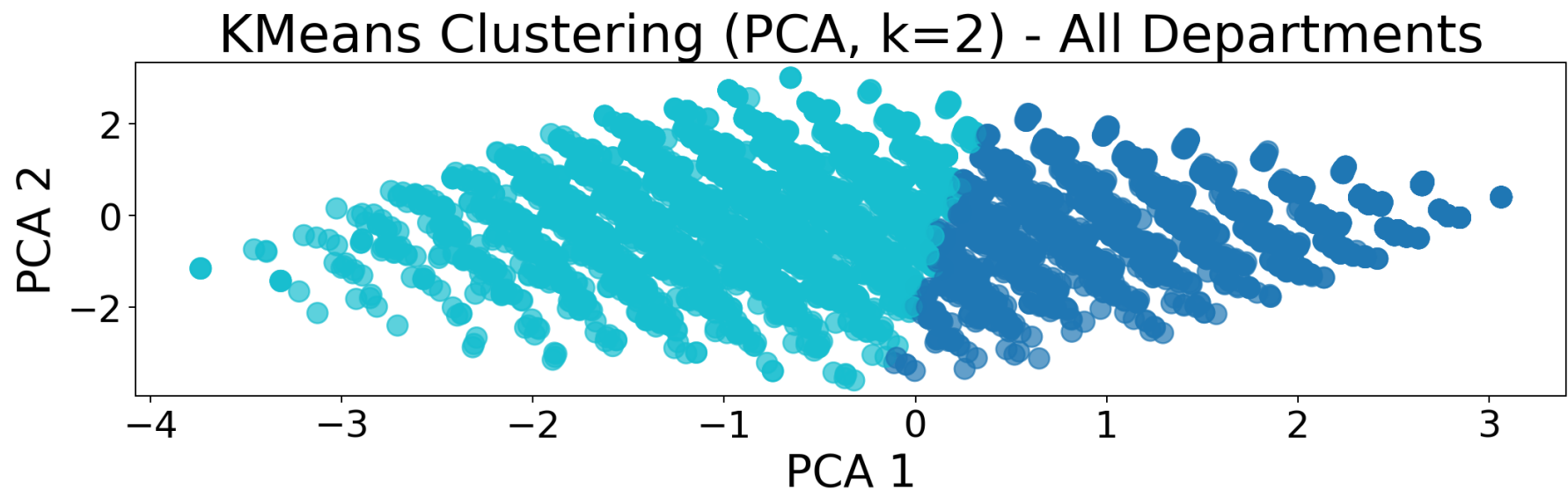
Department: All Departments

Dataset: All Datasets

Clustering (PCA)

KMeans Clustering (PCA, k=2) - All Departments

Cluster Interpretation

Based on the cluster centers, we can interpret the two clusters as follows:

Cluster 1: "Generally Satisfied"

This cluster represents individuals who are generally satisfied with their experience. They have a high likelihood of meeting their objectives (0.38), and tend to rate the venue (0.64), allowance (0.63), and speaker (0.62) positively. While their schedule rating is relatively low (0.21), their overall ratings for facilitator (0.32) and participant (0.34) experiences are still somewhat positive. This cluster likely represents individuals who had a good overall experience, with some minor issues.

Cluster 2: "Generally Dissatisfied"

This cluster represents individuals who are generally dissatisfied with their experience. They have a l ow likelihood of meeting their objectives (-0.27), and tend to rate the venue (-0.45), allowance (-0.44), and speaker (-0.43) negatively. Their schedule rating (-0.15) is also low, and their ratings for fac ilitator (-0.23) and participant (-0.24) experiences are negative as well. This cluster likely represen ts individuals who had a poor overall experience, with few positive aspects.

The two clusters are distinct and well-separated, as indicated by the use of the elbow and silhouette m ethods to choose the value of k (number of clusters) as 2. This suggests that the clustering algorithm has identified two meaningful groups with different characteristics.
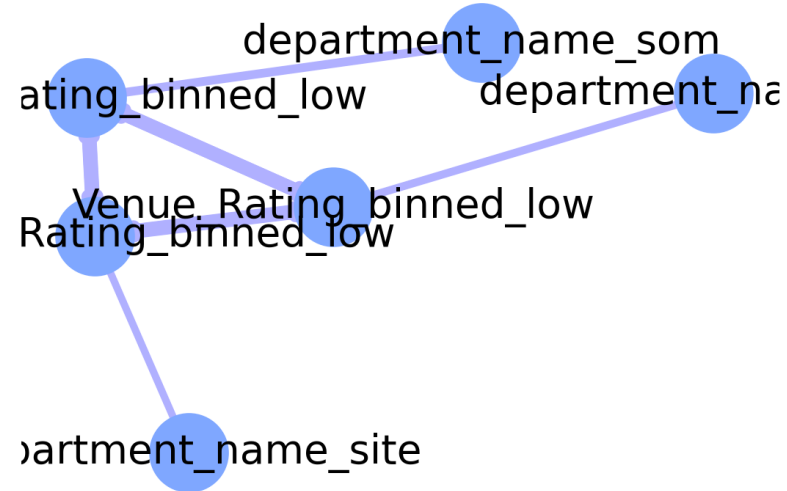
Elbow & Silhouette Plots for k Selection

Elbow Method (Inertia)

Silhouette Score
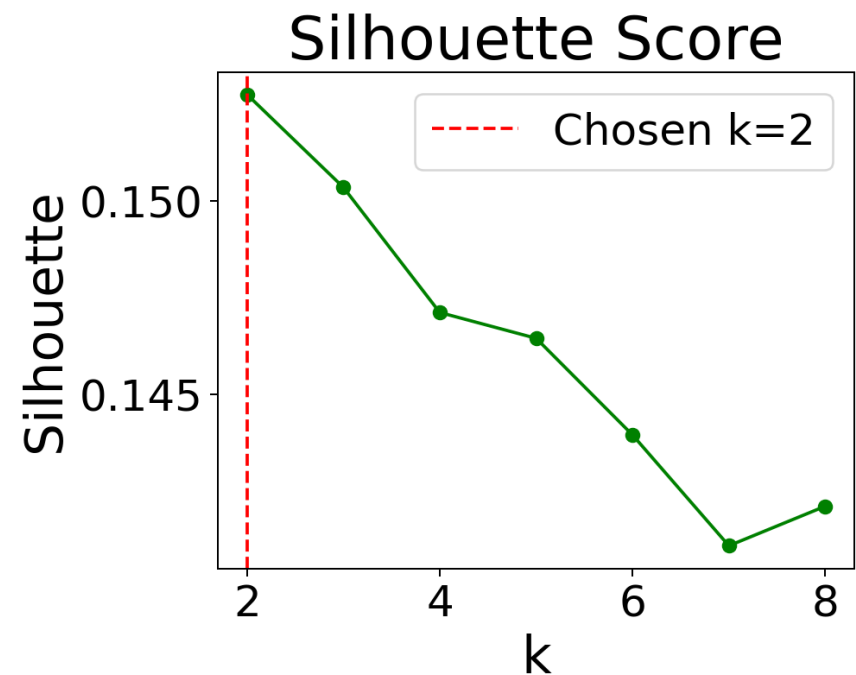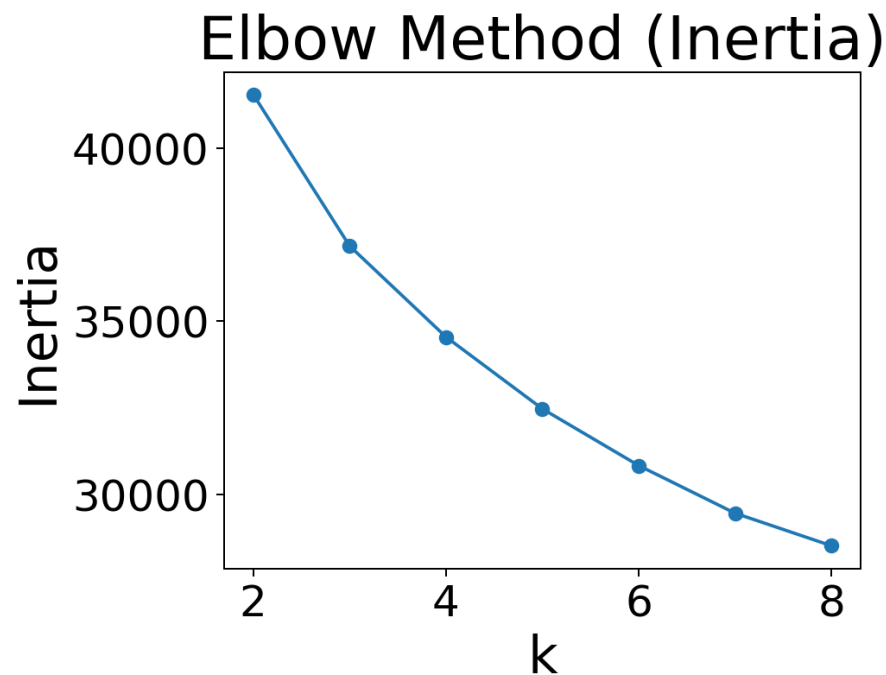
Association Rule Network

Association Rule Network

Association Rule Network (edges: rules, width: lift) - All Departments

department_name_som

department_na

ating_binned_low

Venue_Rating_binned_low

Rating_binned_low

partment_name_site

ARM Results Table

ARM Results Table

Antecedents	Consequents	Support	Confidence	Lift
department_name_beu	Venue_Rating_binned_low	0.102	0.514	1.043
department_name_site	Allowance_Rating_binned_low	0.105	0.507	1.017
department_name_som	Speaker_Rating_binned_low	0.101	0.523	1.074
Allowance_Rating_binned_low	Venue_Rating_binned_low	0.297	0.595	1.207
Venue_Rating_binned_low	Allowance_Rating_binned_low	0.297	0.602	1.207
Venue_Rating_binned_low	Speaker_Rating_binned_low	0.285	0.577	1.184
Speaker_Rating_binned_low	Venue_Rating_binned_low	0.285	0.584	1.184
Allowance_Rating_binned_low	Speaker_Rating_binned_low	0.295	0.592	1.214
Speaker_Rating_binned_low	Allowance_Rating_binned_low	0.295	0.605	1.214
Allowance_Rating_binned_low, Venue_Rating_binned_low	Speaker_Rating_binned_low	0.186	0.628	1.288
Allowance_Rating_binned_low, Speaker_Rating_binned_low	Venue_Rating_binned_low	0.186	0.632	1.281
Venue_Rating_binned_low, Speaker_Rating_binned_low	Allowance_Rating_binned_low	0.186	0.655	1.313

Descriptive Analysis Table

Feature	Mean	Rating
Objectives_Met	1.92	satisfactory
Venue_Rating	1.49	None
Schedule_Rating	1.87	satisfactory
Allowance_Rating	1.50	satisfactory
Speaker_Rating	1.52	satisfactory
Facilitator_Rating	1.89	satisfactory
Participant_Rating	1.91	satisfactory

Descriptive Analysis (Categorical)

Descriptive Analysis for: All Departments
Categorical Columns Value Counts:
department_name value counts:
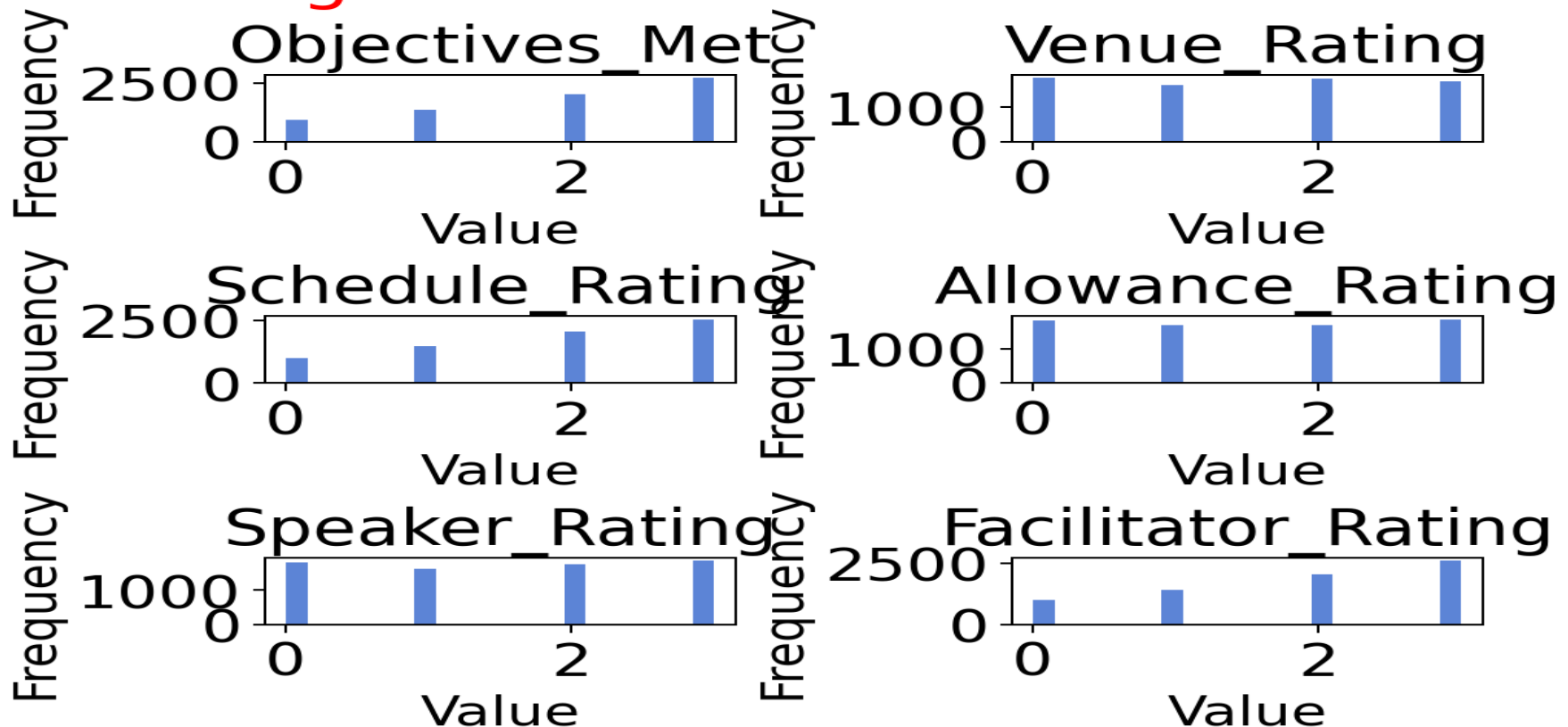department_name
SNAHS   1463
SITE   1461
BEU   1406
SBAHM   1373
SOM   1362

Histograms

Histograms

Recommendations

Recommendations for Improvement:
1. **Venue Rating**: The mean rating of 1.49 is the lowest among all categories, indicating a need for improvement in venue selection or management. Consider gathering more specific feedback on what aspects of the venue were unsatisfactory to make targeted improvements.

2. **Allowance Rating** and **Speaker Rating**: Although both have a satisfactory rating, their mean ratings (1.50 and 1.52, respectively) are on the lower end of the satisfactory spectrum. Reviewing the specifics of the allowances provided and speaker selections might reveal areas for moderate improvement to increase participant satisfaction.

Strengths to Maintain:

1. **Objectives Met**: With a mean rating of 1.92, this category indicates that the events or programs are generally meeting their intended objectives, which is a significant strength. Continuing to focus on clear objective setting and ensuring these are met will be crucial for ongoing success.

2. **Facilitator Rating** and **Participant Rating**: Both of these categories have high mean ratings (1.89 and 1.91, respectively), suggesting that facilitators are effective and participants are engaged and satisfied. Maintaining the quality of facilitation and participant experience is vital for the success of future events.

3. **Schedule Rating**: The satisfactory rating with a mean of 1.87 indicates that scheduling is well-managed. Continuing to prioritize effective scheduling will help in maintaining participant satisfaction and ensuring the smooth operation of events.

Actionable Insights:

1. **Venue and Logistics**: Given the low rating for Venue, it might be beneficial to conduct a more detailed analysis of what specifically contributed to the low rating (e.g., location, amenities, accessibility). This could involve follow-up surveys or focus groups to gather more detailed feedback.

2. **Consistency Across Ratings**: The fact that most categories have ratings very close to each other (around the 1.9 mark) suggests a high level of consistency in the quality of service or experience provided across different aspects of the events. This consistency is a strength and should be maintained.

3. **Feedback Mechanism**: Implementing or enhancing a feedback mechanism that allows for more detailed and specific comments from participants could provide actionable insights for improvement. This could include open-ended questions in surveys or evaluations to gather qualitative feedback.

4. **Benchmarking and Goal Setting**: Using the current mean ratings as a baseline, setting specific, measurable goals for improvement in the weaker areas (Venue, Allowance, Speaker) could help in focusing efforts and measuring progress over time.

Overall, the feedback suggests a well-organized and effective set of events or programs with some areas for targeted improvement, particularly regarding venue selection and possibly allowances and speaker choices. Maintaining strengths while addressing weaker areas will be key to ongoing success.

Trends

Trends

Feature Means Across Years (Baseline: Oldest Year)
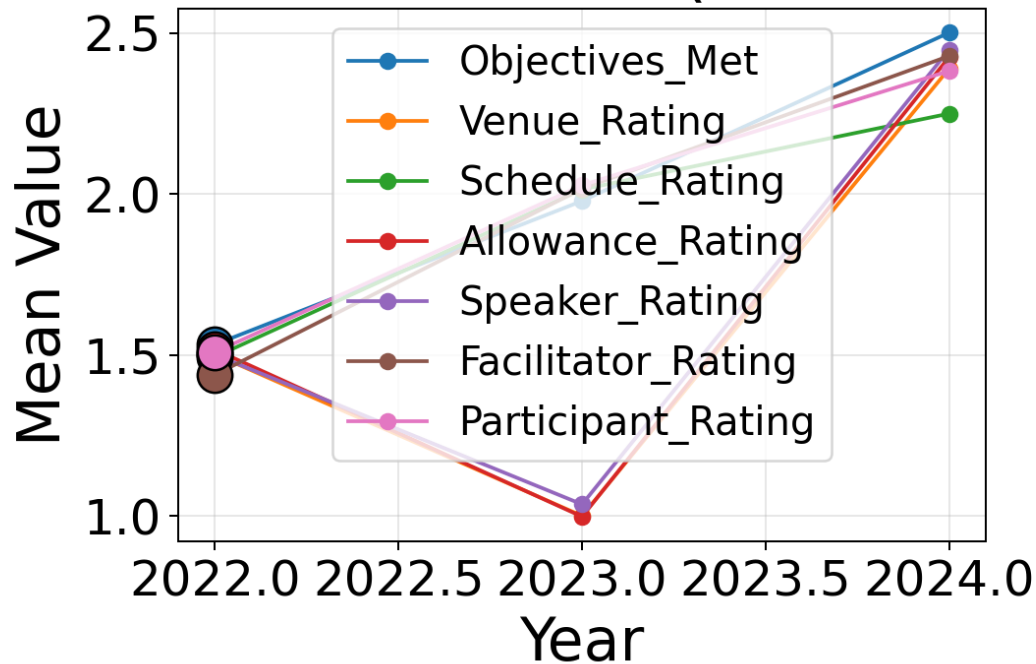
Trends Analysis

To analyze the trends in feature means across years, we will compare the values of each feature between
2022, 2023, and 2024.
1. **Objectives_Met**:
   - 2022: 1.53
   - 2023: 1.98 (increased by 0.45)
   - 2024: 2.50 (increased by 0.52 from 2023)
   - **Improving**: The objectives met have consistently increased, indicating better goal achievement
over time.

2. **Venue_Rating**:
   - 2022: 1.50
   - 2023: 1.00 (decreased by 0.50)
   - 2024: 2.39 (increased by 1.39 from 2023)
   - **Initially Declining, then Improving**: After a significant drop in 2023, venue ratings have sign
ificantly improved in 2024, suggesting effective corrective measures.
3. **Schedule_Rating**:
   - 2022: 1.49
   - 2023: 2.01 (increased by 0.52)
   - 2024: 2.25 (increased by 0.24 from 2023)
   - **Improving**: Schedule ratings have consistently improved, indicating better planning and executi
on over time.
4. **Allowance_Rating**:
   - 2022: 1.52
   - 2023: 1.00 (decreased by 0.52)
   - 2024: 2.42 (increased by 1.42 from 2023)
   - **Initially Declining, then Improving**: Similar to venue ratings, allowance ratings dropped in 20
23 but showed significant improvement in 2024, suggesting successful adjustments.
5. **Speaker_Rating**:
   - 2022: 1.50
   - 2023: 1.04 (decreased by 0.46)
   - 2024: 2.45 (increased by 1.41 from 2023)
   - **Initially Declining, then Improving**: Speaker ratings followed a pattern similar to venue and a
llowance ratings, with a notable decline in 2023 followed by a significant increase in 2024.
6. **Facilitator_Rating**:
   - 2022: 1.44
   - 2023: 2.02 (increased by 0.58)
   - 2024: 2.43 (increased by 0.41 from 2023)
   - **Improving**: Facilitator ratings have shown continuous improvement, indicating better facilitati
on quality over time.
7. **Participant_Rating**:
   - 2022: 1.51
   - 2023: 2.03 (increased by 0.52)
   - 2024: 2.38 (increased by 0.35 from 2023)
   - **Improving**: Participant ratings have consistently increased, reflecting higher participant sati
sfaction over the years.
Actionable Insights:
- **Corrective Actions**: The significant improvements in features like Venue_Rating, Allowance_Rating,
 and Speaker_Rating from 2023 to 2024 suggest that any corrective measures taken after the 2023 ratings

were effective. It's essential to continue and possibly expand these measures.
- **Continuous Improvement**: Features that have shown consistent improvement (Objectives_Met, Schedule_Rating, Facilitator_Rating, Participant_Rating) should continue to be monitored and supported to ensure that the upward trend continues.
- **Sustainability**: For features that had a decline followed by an increase (Venue_Rating, Allowance_Rating, Speaker_Rating), it's crucial to analyze the factors that led to both the decline and the subsequent improvement to ensure sustainability of the positive trends.
- **Performance Metrics**: Consider setting performance metrics and benchmarks for each feature to provide clear targets for improvement and to monitor progress effectively.
- **Feedback Loop**: Establishing or enhancing a feedback loop with participants, speakers, facilitators, and other stakeholders can provide valuable insights into what is working well and what needs improvement, helping to guide strategic decisions.