Report on Analysis of Towson University's Performance and Rankings

Tools Used:

The analysis was conducted in Python using Google Colab. Key libraries included pandas, NumPy, matplotlib, seaborn, and scikit-learn. Final visuals were designed in Canva.

Methodology and Data Preparation:

To compare Towson University (TU) with similar institutions, we began by cleaning and adjusting the dataset. This included:

- standardizing labels of yes/no to 1/0
- evaluate the relevance of columns that went above a threshold of 50% null values
- removed branch campuses and institutions without a Carnegie Classification, that indicated that it was deemed either non-accredited or non-degree granting and many times had too many null values to properly rank. If a university system had multiple campuses, we retained only the main campus unless the additional campus had its own Carnegie designation. This helped ensure consistency when comparing peer institutions.

The original file contained 756 institutions and 107 variables. After data preparation, 728 institutions and 124 columns were retained for analysis.

Feature Engineering:

We added new columns to better contextualize existing data, including, but not limited to:

- Race and ethnicity percentages as a share of the total student body
- Admissions and enrollment rates calculated from applicant and acceptance figures
- Revenue source breakdowns as a percentage of total revenue
- Degrees conferred as a percentage of total enrollment

These additions allowed for more meaningful comparisons between institutions of different sizes and profiles.

Normalization and Scaling:

To ensure fair comparisons across all numeric variables, we applied MinMax normalization, bringing all values to a 0–1 scale. This allowed us to create weighted composite scores without favoring larger schools.

Ranking and Scoring:

Institutions were ranked in four primary categories:

- Student Success
- Affordability & Financial Aid
- Academic Resources
- Access & Equity

Each category score was calculated as a weighted average of a set of normalized metrics. Percentile scores (0 - 100) were then computed for each institution, and Towson's performance was highlighted across all rankings.

Efficiency Metrics:

In addition to rankings, we developed a set of input vs. output metrics to evaluate institutional efficiency. These included, but were not limited to :

- Bachelor's Graduates per Dollar Spent on Instruction
- Bachelor's Graduates per Dollar Saved with Scholarship/Grant
- Student Retention Achieved per Institutional Revenue Dollar

These metrics helped reveal how effectively institutions translate resources into student outcomes.

Findings:

Based on our analysis, Towson University stands out for its student success outcomes and operational efficiency but falls behind in affordability. Compared to peers, TU offers strong return on investment, which presents an opportunity for targeted growth in access and support service