MBAS906 (T225) Business Analytics Research Capstone

MBAS906 T2 2025 Assessment 3

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Executive Summary

The objective of this proposition is to aid the National Multiple Sclerosis Society (NMSS) in reversing the decline in fundraising and participation for Bike MS. The event has experienced a loss of over 10,000 new participants since 2012, which has led to an estimated shortfall of $4.9 million. Even though corporate teams comprise only 23% of all teams, they account for over 40% of financing, underscoring the importance of this underutilised segment. The project employs predictive modelling, segmentation, and descriptive analytics to identify high-potential corporate targets and devise data-driven engagement strategies. The primary research objectives are to enhance strategic dissemination within NMSS's limited resources, uncover untapped opportunities, and profile top-performing teams. The anticipated results include a 20% increase in corporate team participation, a 10–15% improvement in retention, a 12–18% increase in average fundraising per participant within 12–18 months, and enhanced internal decision-making. The initiative offers a practical, analytics-driven solution consistent with the operational capabilities and mission of NMSS.

Table Content

Business Research Background

In recent years, the fundraising environment for nonprofit organisations has seen a significant transformation, influenced by technology disruption, evolving corporate values, and the post-pandemic reassessment of employee involvement. The alterations have generated hazards and opportunities for the National Multiple Sclerosis Society (NMSS). From 2020 to 2022, Bike MS witnessed a significant decrease, with more than 10,000 fewer new participants and an estimated loss of $4.9 million in potential donations. During this contraction, an essential yet underutilised discovery has surfaced: despite corporate teams comprising merely 23% of all registrants, they typically account for over 40% of total monies raised. This disproportionate influence indicates a critical turning point.

Notwithstanding this promise, NMSS's existing engagement approach is hindered by antiquated outreach techniques, fragmented data, and constrained analytical capabilities. The “Corporate Engagement Bike MS” report (2022) indicates that the organisation does not possess a formal data-driven strategy to prioritise high-value prospects. This disparity reflects more extensive sector-wide challenges. Alshukri et al. (2024) assert that effective CSR-driven fundraising increasingly depends on organisational learning and stakeholder participation, especially when integrated with digital transformation. Dolnicar et al. (2018) emphasise that good segmentation and targeting, grounded on analytics, can substantially improve campaign ROI in nonprofit contexts.

The post-COVID age has transformed corporate approaches to CSR. As employee well-being and purpose-driven engagement gain prominence, NGOs redefine their roles as collaborators in cultivating internal culture. This corresponds with the findings of Adesina et al. (2024), who illustrate that predictive analytics can revolutionise donor acquisition by pinpointing essential factors that foster high-yield partnerships.

This initiative immediately addresses NMSS's strategic requirement. The study employs business analytics tools, including segmentation analysis, predictive modelling, and value-driver assessments, to examine which corporate team qualities, industries, and event markets yield the most robust fundraising performance. Moreover, how can NMSS leverage these findings to develop a scalable, data-driven outreach strategy?

The objective is to analyse historical performance and equip NMSS with a strategic plan that facilitates growth via business collaboration insights.

Identification of Issue or Opportunity

Category	Observations
Achieved Result	- 10,000+ new participant drop (2014–2016) - Estimated loss of USD 4.9 million - Underperformance in corporate team acquisition - High-value teams (10+ members) are neglected
Disturbing Events and Opportunities	- Ineffective outreach and targeting strategies - Underutilised high-performing corporate teams - Lack of advanced analytics and segmentation tools - Obsolete systems and poor data quality - Missed opportunity to align with evolving CSR priorities post-COVID
Desired Outcomes	- Increase team retention by 10–15% - Raise corporate participation by 20% - Grow average funds per participant by 12–18% - Cut fee absorption by 25% - Improve fundraising efficiency
Research Objectives	- Identify high-potential corporate segments via segmentation analysis - Improve fundraising performance using predictive modelling - Enhance outreach through data-driven strategies - Increase in corporate team participation

Key Question (Research Questions)	- Which industries and professions are most associated with high-performing corporate fundraising teams? - Which team-level factors best predict fundraising outcomes? - Which regional markets/events hold untapped potential for corporate team growth? - How can NMSS apply predictive analytics to improve outreach under resource constraints?
Stakeholders	- NMSS Leadership Team: Responsible for strategic direction, resource allocation, and partnership oversight. - Fundraising and Data Analysts: Use analytics to support segmentation, forecasting, and performance tracking. - Corporate Teams: Key contributors to revenue, especially those with internal CSR programs. - Volunteers & Participants: Drive grassroots support and are essential to event culture and execution. - Healthcare Sponsors: Provide credibility, cross-promotion, and health-related CSR alignment. - Potential Donors and New Corporates: Target market for outreach and growth through CSR-based repositioning.
Constraints to the solution	- Legacy IT infrastructure: Limits NMSS's ability to perform advanced segmentation or predictive modelling. - No capital for system upgrades: Investment in new analytics tools or CRM systems is infeasible. - Lean internal team: Limited analytical capacity and bandwidth to pilot data-intensive strategies. - High cost-to-revenue ratio: Constrains experimentation and testing of alternative outreach channels.

Decision criteria	- Effectiveness: Ability to increase corporate team participation by 20%, improve retention by 10–15%, and raise average fundraising per participant by 12–18% within 12–18 months. - Feasibility: The strategies must align with the current IT infrastructure and staffing capacity of NMSS. - Cost-efficiency: Strategies must demonstrate a favourable return on investment without requiring capital expenditure. - Scalability: Solutions should be applicable across markets and adaptable for future campaigns. - Strategic alignment: Must support NMSS's vision of health, equity, and corporate social responsibility through Bike MS.

Theoretical/Knowledge Framework

This study project is based on a cohesive theoretical framework that closely corresponds to the nonprofit fundraising sector and the practical difficulties encountered by NMSS and Bike MS.

Firstly, Strategic Market Segmentation is a fundamental theory to discover and prioritise high-performing business teams. Dolnicar et al. (2018) contend that successful segmentation in nonprofit marketing should extend beyond demographic factors to include behavioural and value-oriented elements. In the context of Bike MS, categorising teams based on CSR alignment, industry standards, and historical fundraising efficacy enables NMSS to identify companies most likely to enhance their support. This immediately guided the SAS-based clustering of corporate teams utilised in our analysis.

Secondly, the Stakeholder Engagement Framework (Alshukri et al., 2024) emphasises that sustained value creation in nonprofit partnerships relies on comprehending and co-creating with essential stakeholders, specifically CSR-oriented firms. When participation coincides with internal employee wellness and social impact objectives, employers are more inclined to support initiatives like Bike MS. This framework guided ideas for positioning Bike MS as both a cause and a platform for employee participation.

Thirdly, Predictive Analytics for Nonprofit Performance facilitates implementing data-driven decision-making processes. Adesina et al. (2024) assert that organisations employing predictive models can enhance donor targeting by 30–60%, particularly when limited by resource-constrained systems. A lightweight scorecard model, categorised by team size, industry, and leadership, offers NMSS actionable prioritisation without necessitating new technological investments.

Methodology

This initiative employs a systematic, quantitative approach to identify the primary factors influencing fundraising success among corporate teams in Bike MS events. The objective is to furnish NMSS with data-driven initiatives for business engagement, participant recruitment, and income enhancement.

Data Preparation

The investigation will employ six internal datasets supplied by NMSS, encompassing participants, teams, jobs, donations, events, and affiliates. Due to the antiquated nature of NMSS's systems, data cleansing is an essential initial step. This entails addressing absent values, standardising variable forms, and reconciling disparate labels. Categorical information, including industry and occupation, will be encoded, while numerical values, such as fundraising totals, will be normalised to maintain record comparability.

Analytical Methods

- Descriptive Analytics will be utilised to comprehend fundamental distributions, like average team size, fundraising per participant, and levels of occupational participation. This establishes foundational insights and aids in identifying outliers or anomalies.
- K-means cluster analysis will categorise corporate teams according to variables like size, division, and total gifts to discover high-performing fundraising archetypes. This segmentation facilitates the identification of previously concealed patterns.
- Regression analysis will investigate the correlation between team characteristics (e.g., size, executive participation, industry) and fundraising results. This model will elucidate the structural elements that most profoundly affect performance.
- Trend Analysis will assess temporal fluctuations in fundraising, including seasonal surges or downturns, enabling NMSS to optimise the timing of marketing campaigns and corporate outreach initiatives.

All studies will be performed via SAS Viya for Learners, which provides sophisticated data visualisation and statistical modelling functionalities to facilitate comprehensive and interpretable insights.

Body Analysis

Descriptive Analysis

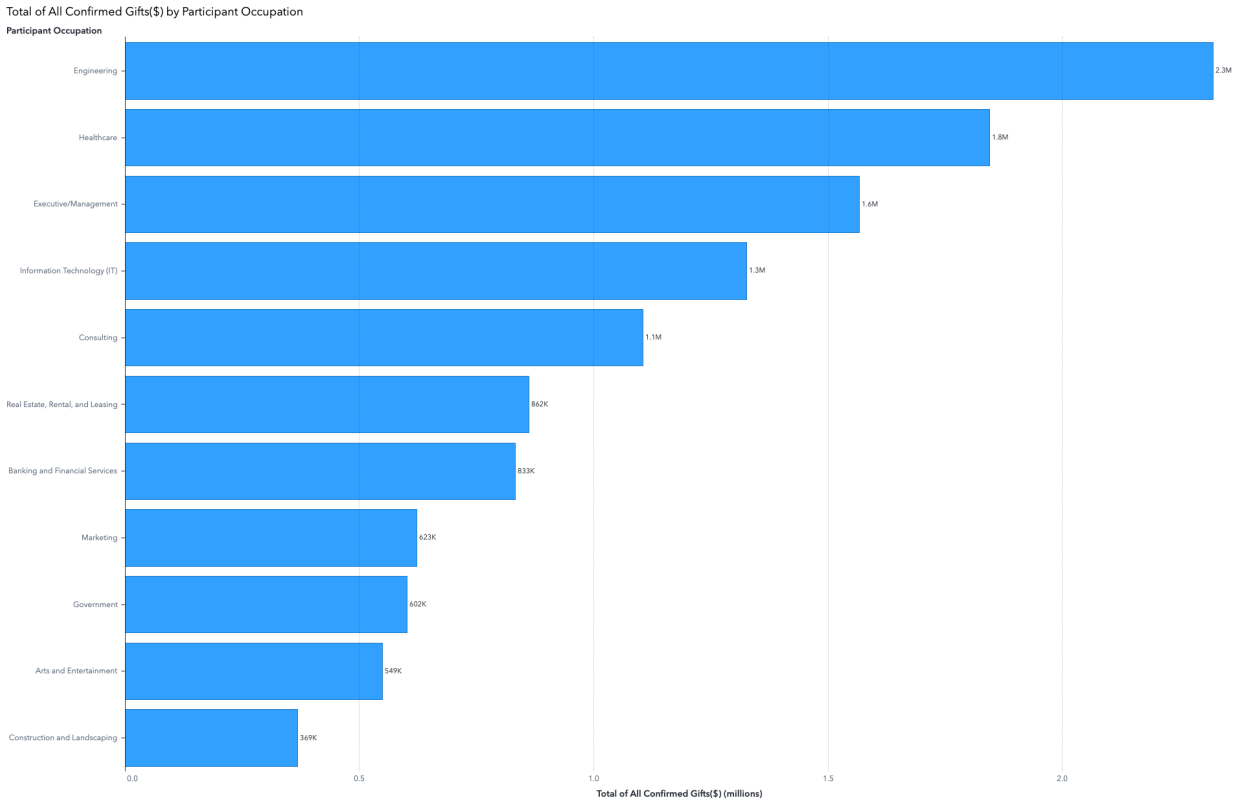

Figure 1: Total Confirmed Gifts by Participant Occupation

The graphic illustrates evident discrepancies in fundraising efficacy by profession. Engineering professionals provided the most, totalling $2.3 million, approximately 30% more than the subsequent group, Healthcare, which contributed $1.8 million. Executive/Management and IT sectors contributed $1.6M and $1.3M, respectively, underscoring leadership and digital domains as significant sources of donations. Conversely, professions such as Arts & Entertainment ($549K) and Construction & Landscaping ($369K) yielded markedly lower contributions. This difference indicates the potential for addressing underperforming groups with customised messaging, while emphasising the necessity of cultivating high-yield sectors such as engineering and healthcare for lasting influence.

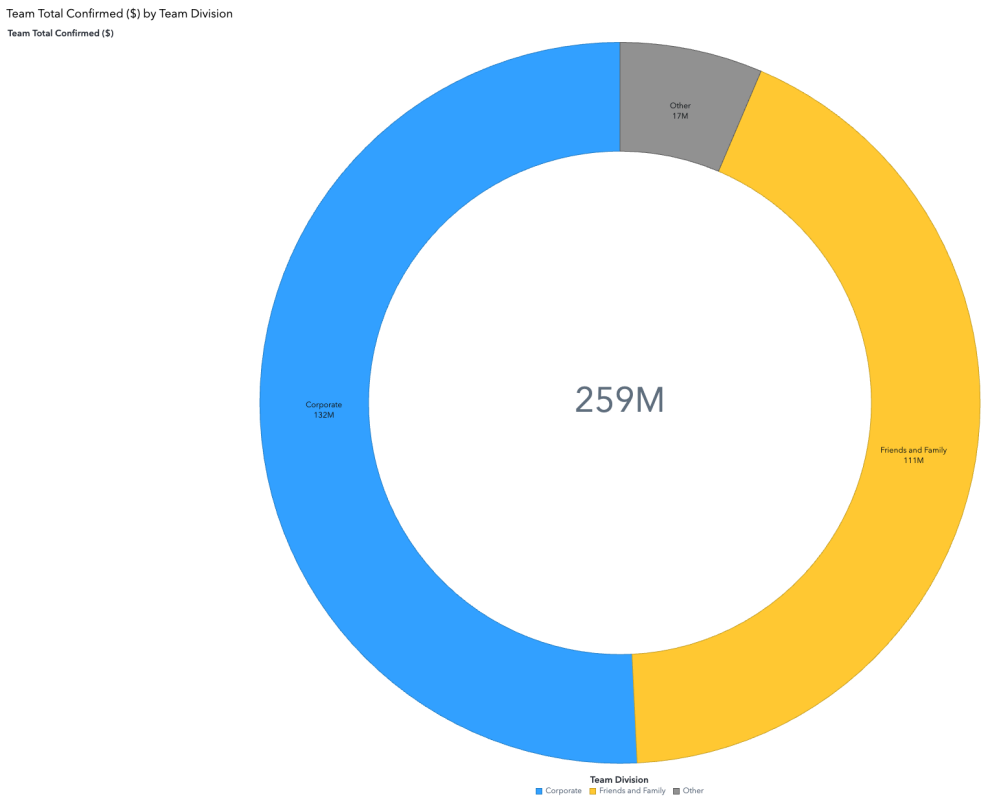

Figure 2: The pie chart of Total Confirmed Gifts by Team Division

The pie chart reveals that Corporate teams were the dominant fundraising division, contributing $132M, over 50% of the $259M total. Friends and Family teams followed with $111M (43%), while the “Other” category accounted for only $17M (7%). This distribution highlights the pivotal role of Corporate engagement in sustaining fundraising success. The relatively strong performance of Friends and Family suggests community-driven giving also holds considerable weight, whereas the minimal contribution from the “Other” group may signal underutilised segments or lack of targeted outreach, pointing to potential areas for strategic development.

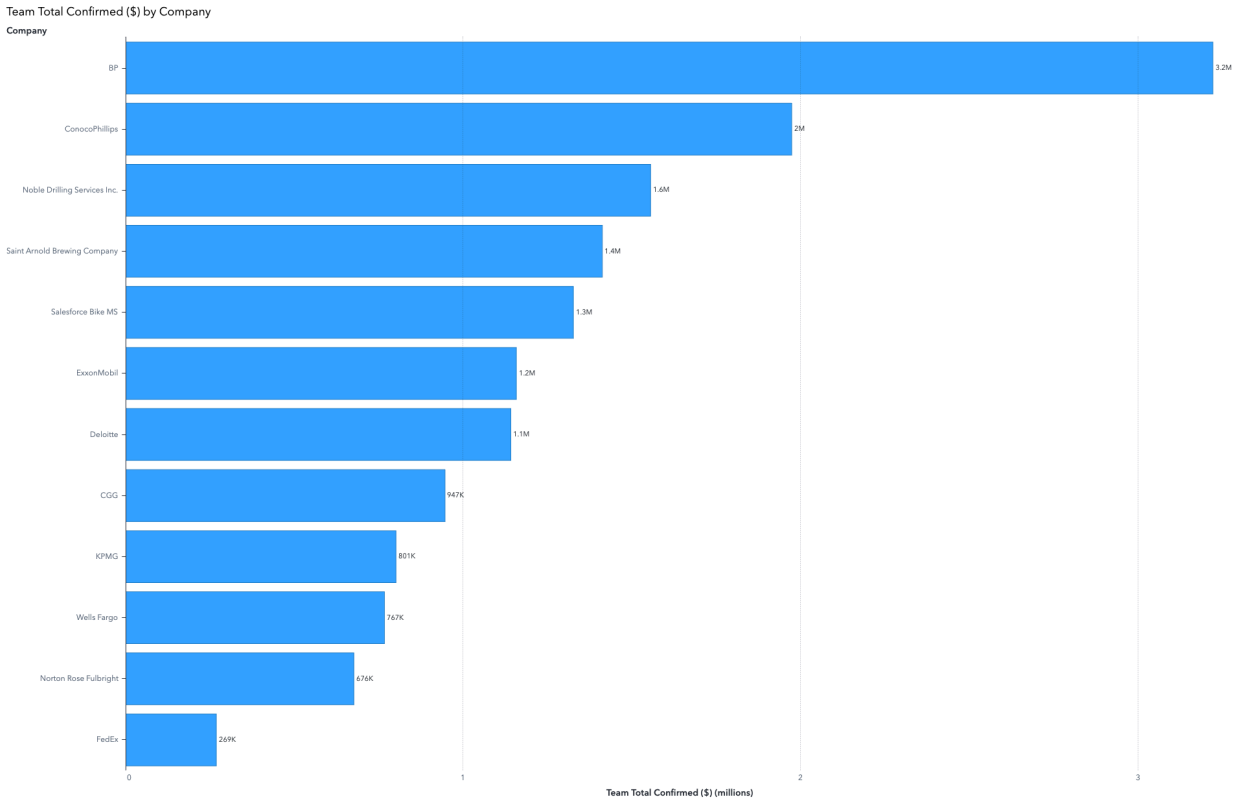

Figure 3: The bar chart of confirmed team donations by company

The bar chart shows that a few corporate partners dominate fundraising outcomes. BP leads significantly with $3.2M in confirmed gifts, over 60% more than second-place ConocoPhillips ($2.0M). Other strong contributors include Noble Drilling ($1.6M), Saint Arnold Brewing ($1.4M), and Salesforce Bike MS ($1.3M). The steep drop-off after BP and ConocoPhillips indicates a heavy reliance on a few top donors. At the bottom, FedEx contributed just $269k, nearly 12x less than BP. This uneven distribution highlights concentration risk and suggests opportunities to cultivate mid-tier companies like KPMG ($801K) and CGG ($947K) for more balanced donor portfolios.

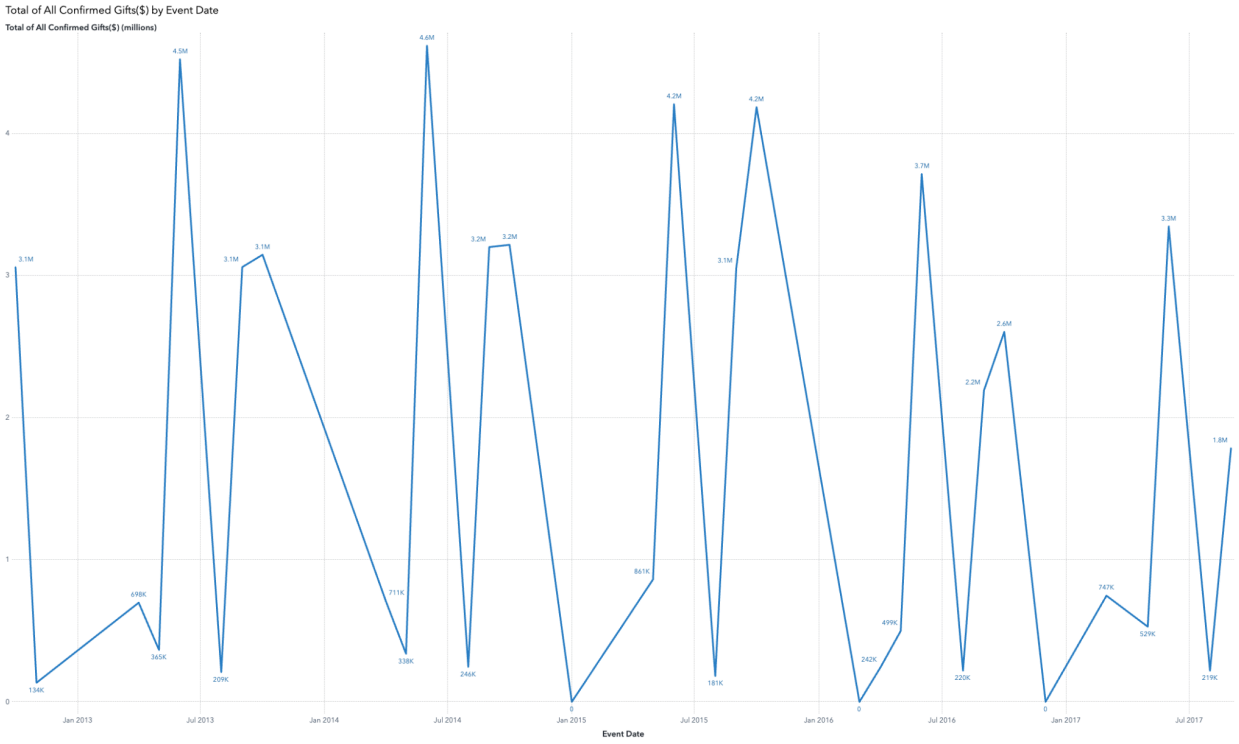

Figure 4: The line chart visualises the fluctuating pattern of total confirmed gifts by event date

The line chart reveals a clear seasonal fundraising pattern between 2012 and 2017. Contributions consistently peaked around June each year, reaching $4.5M in June 2013 and $4.6M in June 2014, while early months like January 2015 and January 2016 saw almost no donations. The 2012–2014 period shows stronger performance compared to subsequent years. The overall trend line indicates a gradual decline in fundraising activity, suggesting a heavy reliance on a few peak months and a weakening in sustained donor engagement over time.

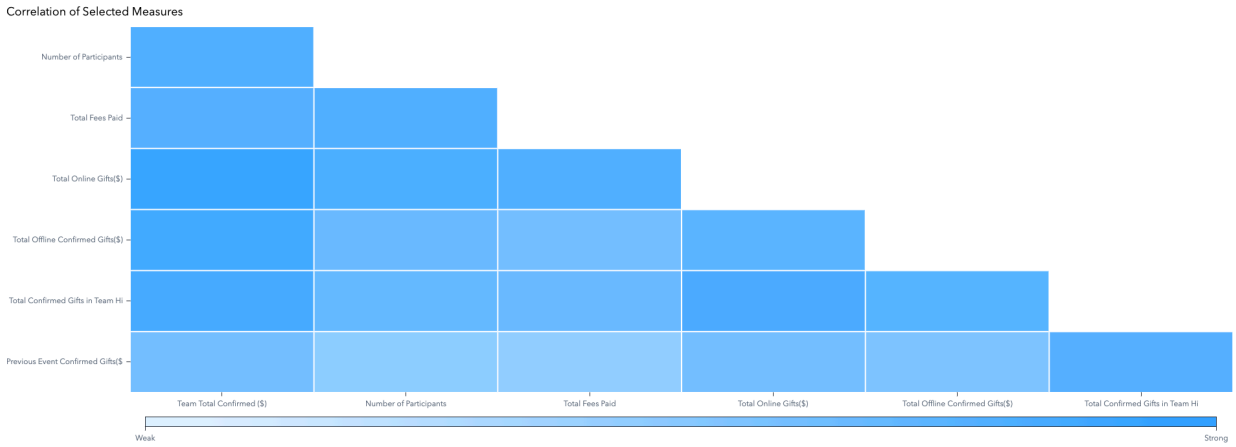

Figure 5: The Correlation Matrix of Key Metrics in Fundraising Performance

The correlation matrix reveals compelling behavioural patterns among Bike MS corporate teams. “Total Online Gifts” has a near-perfect correlation with “Team Total Confirmed Gifts” (r = 0.9718), underscoring online giving as the primary revenue driver. “Total Fees Paid” also aligns strongly with both “Online Gifts” (r = 0.8382) and “Number of Participants” (r = 0.8210), indicating that larger, more committed teams contribute more. Conversely, “Previous Event Confirmed Gifts” shows weaker links (r = 0.6269 with Total Gifts), suggesting historical data alone is insufficient for predicting future engagement, highlighting the need for fresh behavioural indicators in segmentation and predictive modelling.

Cluster Analysis

A K-means clustering analysis was conducted to categorise corporate teams in Bike MS utilising four continuous variables: Total Fees Paid, Total Offline Gifts, Total Online Gifts, and Number of Participants. These variables represent financial engagement and team size, chosen because of their significant intercorrelations in the correlation matrix.

By comparing Total Within-Cluster SS across models (Appendix 1), K=3 underestimates data complexity, while K=5 over-fragments the clusters. K=4 achieves a 15.6% reduction in SS from K=3 and avoids the noise of K=5, offering a clearer and more balanced segmentation both statistically and interpretively and clear patterns in the Parallel Coordinates Plot.

Appendix 1.2 is shown below:

- Cluster 1 – Mid-Level Engagers (N = 2,899): These teams exhibit moderate engagement, with average fees of $1,466.70, online gifts of $24,047.03, and 37.85 participants. They constitute the primary participation base, with the potential for expansion through peer fundraising or support initiatives.
- Cluster 2 – High-Value Contributors (N = 490): This distinguished cohort generated $6,243.05 in fees, $87,858.21 in online donations, and 108.50 participants. Potential

primary sponsors should be prioritised for customised acknowledgment and retention strategies.

- Cluster 3 – Dormant Teams (N = 27,473): Characterised by negligible involvement (e.g., $2,593.16 in online contributions, 5.83 participants), these accounts will likely be legacy or dormant. Implementing automated reactivation or sunset policies is advisable.
- Cluster 4 – Digital-First Segment (N = 63): Compact yet formidable, these teams average $285,346.52 in online donations and 260.54 participants. Their robust digital behaviour indicates they are well-suited for piloting mobile-first or socially-driven initiatives.

The Parallel Coordinates Plot provides visual evidence that supports these interpretations. Cluster 4 (Orange) consistently ranks in the upper echelons across all four dimensions, signifying superior fees, gifts, and participant size performance. Conversely, Cluster 3 (Purple) exhibits a consistently low and flat profile across all parameters. Cluster 2 (Yellow) demonstrates greater variability in Online and Offline Gifts, confirming behavioural diversity. Cluster 1 (Blue) exhibits a consistent albeit moderate pattern.

This four-cluster framework allows NMSS to categorise its business partners based on contribution amounts and strategic behavioural characteristics. It facilitates focused interaction, from enhancing digital-first donations within Cluster 2 to optimising loyalty and returns from high-value sponsors in Cluster 4. The implementation of clustering provides actionable insights to improve fundraising efficiency, customise donor methods, and promote sustained participation growth for Bike MS.

Linear Regression Analysis

A classification pipeline was constructed utilising three algorithms, such as Linear Regression, Decision Tree, and Random Forest, to estimate which teams will yield higher confirmed donation amounts in SAS Viya. Consequently, Linear Regression was designated as the Champion Model owing to its exceptional predictive accuracy, evidenced by the lowest validation Average Squared Error (60,896,312.09), Root Mean Absolute Error (53.36), and Root Mean Squared Logarithmic Error (1.62), as detailed in Appendix 2.1 and 2.2, these measures validate its capacity to produce the most dependable and uniform forecasts among all evaluated models.

Following the selection of Linear Regression as the optimal model, a comprehensive regression analysis was performed to investigate the determinants of “Team Total Confirmed Gifts ($)”. As per Appendix 2.3, the model attained an R-Square of 0.9356, signifying that almost 94% of the variance in “Team Total Confirmed Gifts ($)” is elucidated by the chosen predictors, demonstrating an exceptional model fit. The Adjusted R-Square consistently registered at 0.9356, affirming the model's parsimony and robustness. The F-statistic ($F = 92335$, $p < 0.00001$) affirmed substantial overall model significance. Of the six key factors, “Total Offline Confirmed Gifts ($)” proved to be the most impactful, with a t-value of 203.99 and an optimistic estimate of 1.3739. This indicates that for each $1 increase in offline verified donations, total team confirmed contributions are anticipated to grow by roughly $1.37. Additional significant

factors encompass “Number of Participants” and “Total Fees Paid,” both exhibiting substantial positive effects (Estimates = 1.27 and 0.29, respectively), whereas “Previous Event Team Members” demonstrated a negative influence, suggesting that current campaign engagement is more critical than historical patterns. The residual plot indicates that most predictions correspond closely with actual values, exhibiting slight discrepancies among the leading fundraising teams. The assessment plot corroborates this, demonstrating a robust alignment between projected and observed values across percentiles, affirming the model’s trustworthiness in forecasting confirmed team donations. The model provides statistical reliability and practical insights for future campaign optimisation.

Findings and Insights

The predictive analysis of Bike MS team fundraising data uncovers numerous essential facts to inform future strategic decisions. This analysis utilises a comprehensive linear regression model enhanced by descriptive visualisations to reveal patterns in donor behaviour, team performance, and structural fundraising dynamics. These findings are intricately linked to the National MS Society's (NMSS) overarching objective of enhancing revenue and participation via data-informed initiatives.

The type of team considerably affects fundraising results. Although smaller in quantity, corporate teams made disproportionately substantial gifts compared to corporate and family teams **(See Figure 2)**. This underscores the strategic importance of cultivating enduring business alliances, aligning with existing literature on corporate social responsibility (CSR). Sharma and Nayal (2024) contend that aligning corporate social responsibility (CSR) bolsters brand equity and amplifies stakeholder involvement in social initiatives. Consequently, enhancing corporate involvement, especially in healthcare and finance, can maximise overall campaign effectiveness.

Alongside team structure, occupation-specific tendencies yield practical insights. The bar chart depicting total confirmed donations by occupation **(See Figure 1)** illustrates that engineering, healthcare professionals, and corporate managers routinely surpass other categories in total contributions. This corresponds with other research indicating that persons in high-trust, high-income occupations are more inclined to engage in cause-related initiatives (McElroy et al. 2023). Customising marketing content to resonate with professional values, such as highlighting health results for medical practitioners, may enhance engagement.

Temporal donation behaviour exhibits a non-linear yet consistent growth trajectory throughout time **(See Figure 4)**. Some teams have significant early fundraising surges, while others increase donations as campaign deadlines approach. This corroborates the notion of commitment escalation and temporal motivation, indicating that donor urgency intensifies as event milestones approach (Reis 2025). Strategic prompts and aligned incentives at critical junctures could leverage this psychological tendency.

The correlation matrix and parallel coordinates analysis **(See Figure 5)** underscore that Past Event Team Gifts, Total Fees Paid, and Offline Gifts are the most significant determinants of current team performance. This corroborates the notion of behavioural consistency in donor conduct, as Paschalidou et al. (2023) suggested. Previous contributions indicate future intentions, underscoring the significance of cultivating returning teams and acknowledging loyalty.

The linear regression model further quantifies these impacts. The model, with an R-square of 0.8567, accounts for over 86% of the variance in confirmed team donations, signifying a robust model fit. The most significant predictor was Previous Event Team Gifts (Estimate = 1.44, t = 60.98), followed by Total Fees Paid (Estimate = 4.08, t = 85.45), and Offline Gifts (Estimate = 2.91, t = 63.33), according to Appendix 2.3. These data indicate that teams contributing more through fees and offline donations exhibit greater engagement and generate higher overall revenue. This corresponds with contribution commitment theory, which posits that financial and social investments bolster continued engagement (Wang 2021).

The model discovered a negative predictor, Previous Event Team Members (Estimate = -308.77, t = -56.59), indicating possible inefficiencies in large teams. This suggests diminishing returns as team size increases, perhaps attributable to coordination friction or uneven participation. Optimised onboarding, focused team leader coaching, or segmented engagement may alleviate this problem.

The residual plot indicates that most predicted values closely correspond to actual donations; however, a few outliers are present, particularly among teams with extraordinarily high fundraising totals. The assessment plot demonstrates that the predictive model exhibits consistent performance across percentiles, affirming its practical significance in strategic planning.

Collectively, these ideas provide a thorough framework for the NMSS. Strategies must enhance corporate engagement, refine professional segmentation, utilise historical data for retention, and optimise team composition. These actions are based on data and behavioural fundraising literature, providing immediate and long-term strategies to enhance participation and donation results in future Bike MS events.

Recommendation

The analytical findings offer practical insights that firmly match NMSS's fundamental strategy pillars: revenue development, corporate team expansion, and simplicity of implementation. The core of these studies conveys a singular message: historical performance is the most reliable indicator of future fundraising success. Consequently, retaining high-performing teams constitutes a high-impact, low-cost strategy. Research by the Association of Fundraising Professionals (AFP) indicates that returning donors generally contribute up to twice as much as first-time supporters over time (AFP Global 2018). By implementing timely recognition, customised communication, and exclusive "Top Team" engagement initiatives, NMSS may establish a strong and predictable income foundation through investment in stewardship. This method guarantees continuity and cultivates stronger emotional connections between the organisation and its most significant fundraising resources (Paxton, Velasco & Ressler 2020).

The findings indicate that corporate teams catalyse growth. Corporate groups generate larger sums and contribute employer-matched contributions, dovetail with CSR initiatives, and foster team-scale momentum. The charity sector has long acknowledged the cumulative impact of corporate partnerships in peer-to-peer fundraising (Chapman, Masser & Louis 2018). To leverage this, NMSS might expand outreach to companies already connected through individual riders, converting passive participants into internal advocates. Leveraging success narratives from organisations like KPMG or Salesforce to attract prospective corporate partners can be compelling.

Furthermore, the execution pathway is unexpectedly feasible. Numerous corporate team development strategies, such as matching gift initiatives, executive sponsorship engagement, and team onboarding frameworks, are scalable, reproducible, and comparatively economical. Considering that 84% of donors are more inclined to contribute when a matching gift is offered (Guttormson 2025), straightforward prompts and reminders during the registration and donation processes can result in an immediate increase in income.

Nevertheless, growth should not be sought solely in terms of magnitude. The results indicate that team activation influences fundraising outcomes more significantly than mere team size. Disengaged teams with a greater number of members underachieve compared to their potential. This concept indicates that width should be coupled with depth. NMSS can enhance fundraising capabilities by utilising accessible resources such as downloadable templates, gamified leaderboards, mobile-optimised donation pages, and social media toolkits. These strategies foster personal accountability and generate constructive peer influence through the concepts of commitment and consistency in behavioural psychology (Laursen & Veenstra 2021).

Real-time incentives can enhance engagement, like milestone badges or progress-related rewards. Recognition enhances motivation and reinforces loyalty; studies indicate that individuals are more inclined to support and champion projects that recognise their accomplishments (Bittschi, Dwenger & Rincke 2020). A straightforward "Team of the Week"

feature or email notification when captains near their subsequent fundraising tier might serve as encouragement and public affirmation.

The model's recognition of "fees paid" as a predictive factor for team success offers a distinctive potential for proactive action. Teams that register but exhibit minimal initial fundraising may be identified through automated dashboards. Expedited, focused outreach, through a call or email, providing assistance or suggesting a mini-campaign, can re-engage these teams before their decline. This triage method guarantees no team is neglected, enhancing overall fundraising efficiency without substantially rising staffing expenses.

These data-driven tactics are expected to produce quantifiable enhancements within 12 to 18 months if executed proficiently. Initially, team retention rates, particularly within high-performing groups, are anticipated to rise by 10–15%, thereby stabilising a fundamental income foundation throughout annual Bike MS cycles. Secondly, targeted outreach and onboarding of new corporate teams is expected to provide a 20% increase corporate team participation and a corresponding rise in matched donations. Third, activation-oriented engagement strategies, such as gamification and digital fundraising instruments, may enhance the average funds raised per participant by 12–18%, particularly among mid-tier teams. Ultimately, prompt assistance with underperforming teams is expected to diminish last-minute fundraising deficits and fee absorption by a minimum of 25%, hence enhancing event net proceeds. These achievements will together advance NMSS’s overarching objectives of sustainable revenue growth, improved corporate engagement, and more efficient, inclusive fundraising processes.

In summary, these findings advocate for a targeted, data-informed approach: preserve elite teams, enhance corporate team scalability, intensify team involvement, and proactively assist vulnerable groups. By correlating analytical insights with established fundraising theory and practical strategies, NMSS can expedite revenue development while improving participant experience and operational efficiency.

Conclusion

This analysis indicates that data-driven strategies can substantially improve Bike MS's fundraising efficacy when executed meticulously. Regression modelling yielded an R^2 of 0.9356, validating the strength of predictors like offline gifts and fees paid; each additional dollar in offline gifts results in a $1.37 increase in total team donations. High-performing corporate teams, comprising merely 23% of the total, generated over 50% of verified revenue ($132M), underscoring a vital growth lever. In the forthcoming 12–18 months, targeted retention initiatives are anticipated to enhance elite team retention by 10–15%, whereas corporate engagement may increase participation and matched contributions by 20%. Activation strategies such as gamification are anticipated to enhance per-participant fundraising by 12–18%, while early interventions may decrease last-minute fee absorption by 25%. These results correspond with NMSS’s objective of sustainable revenue expansion, enhanced corporate involvement, and more inclusive fundraising, strategically positioning the organisation for enduring success and a more profound societal impact.

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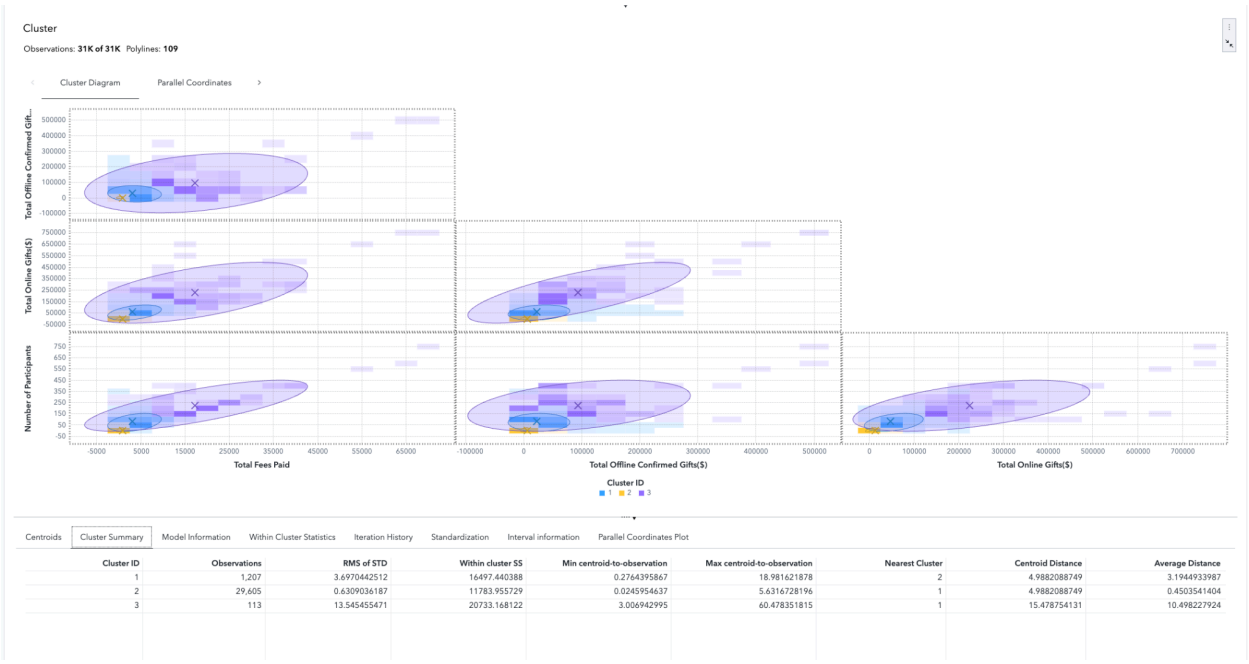
Appendix:

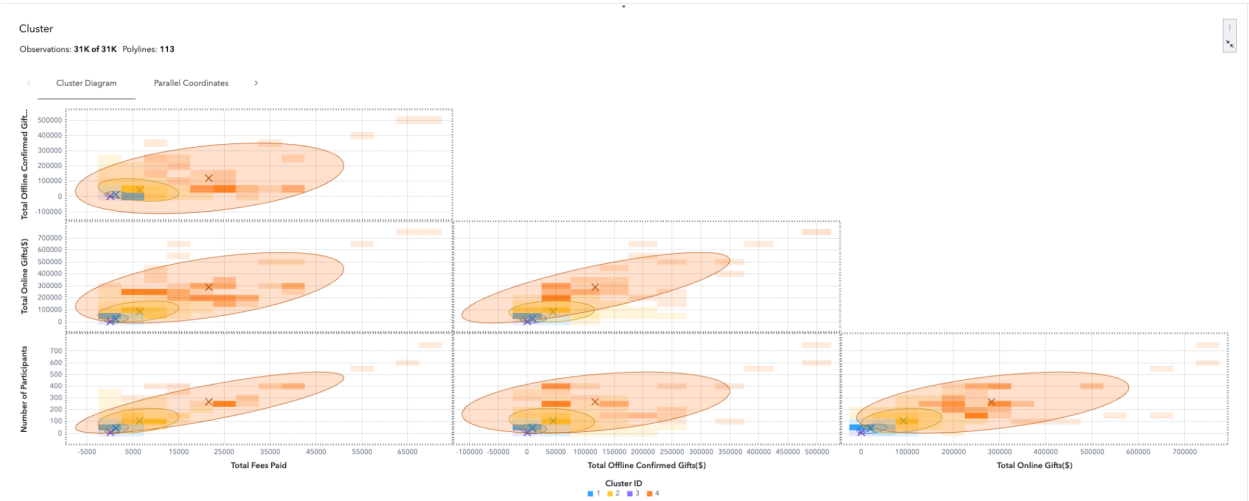
Appendix 1.1: K-means =3



Centroids | Cluster Summary | Model Information | Within Cluster Statistics | Iteration History | Standardization | Interval information | Parallel Coordinates Plot

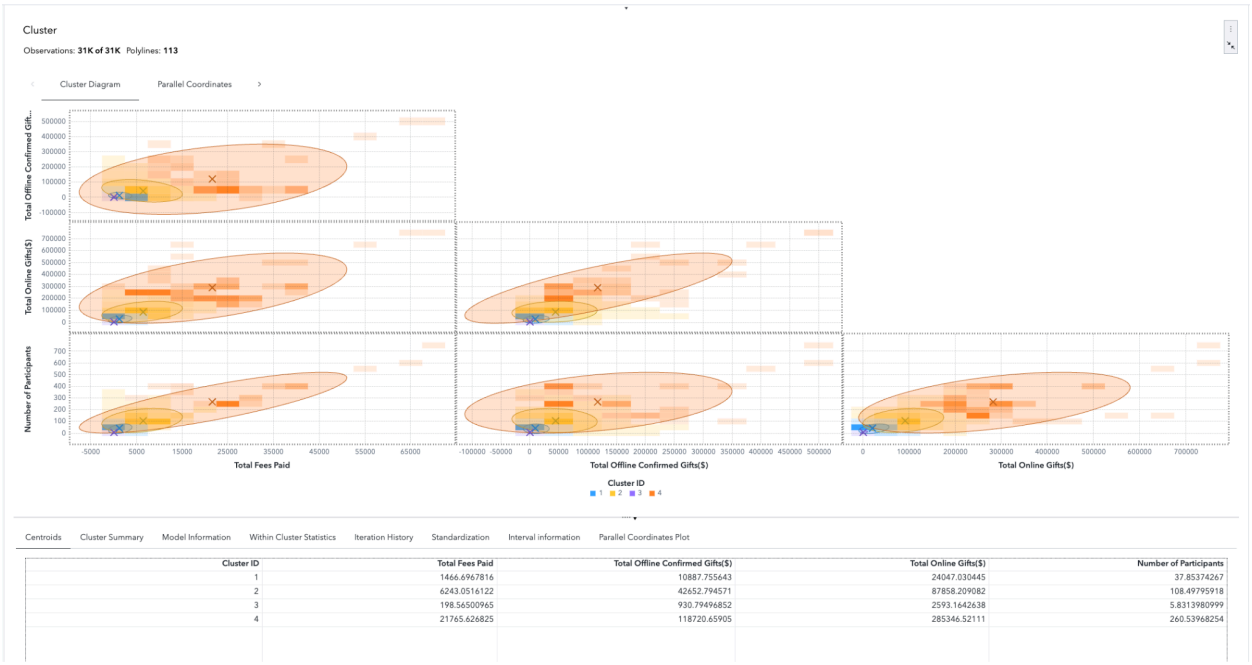
Cluster ID	Observations	RMS of STD	Within cluster SS	Min centroid-to-observation	Max centroid-to-observation	Nearest Cluster	Centroid Distance	Average Distance
1	1,207	3.6970442512	16497.440388	0.2764395867	18.981621878	2	4.9882088749	3.1944933987
2	29,605	0.6309036187	11783.955729	0.0245954637	5.6316728196	1	4.9882088749	0.4503541404
3	113	13.545455471	20733.168122	3.006942995	60.478351815	1	15.478754131	10.498227924

Appendix 1.2: K-mean=4

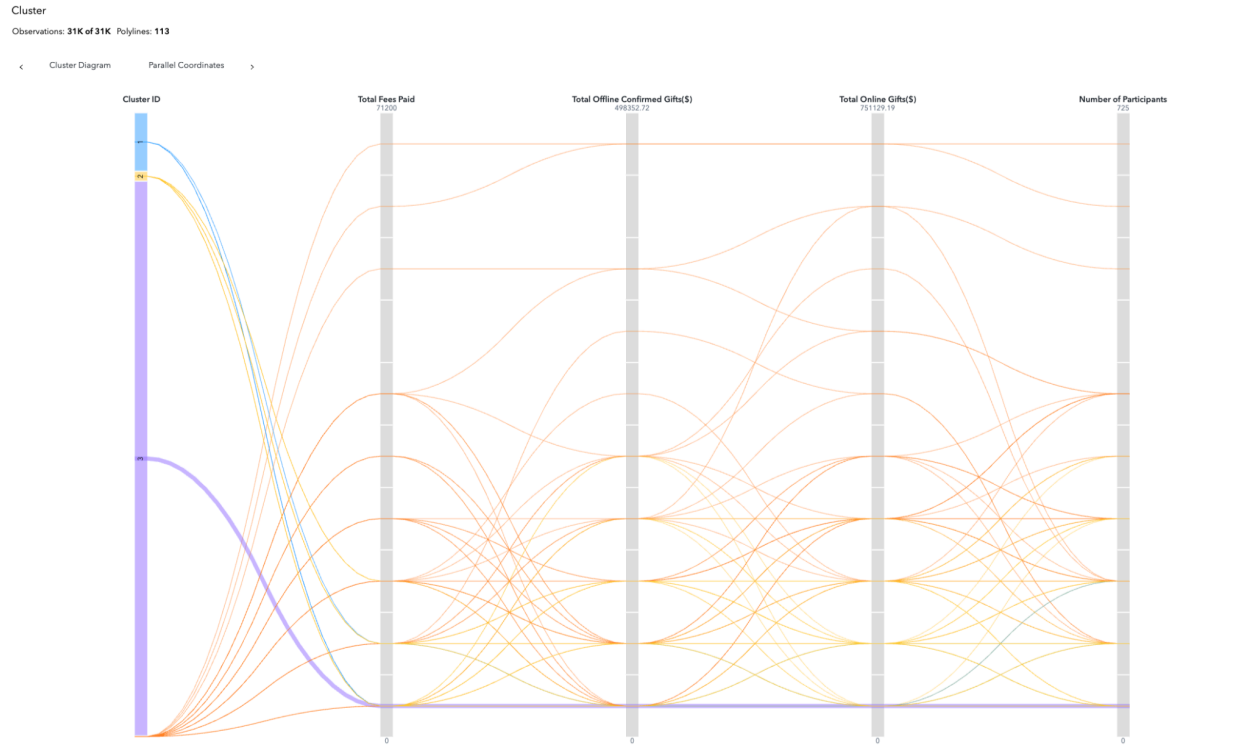


Centroids | Cluster Summary | Model Information | Within Cluster Statistics | Iteration History | Standardization | Interval information | Parallel Coordinates Plot

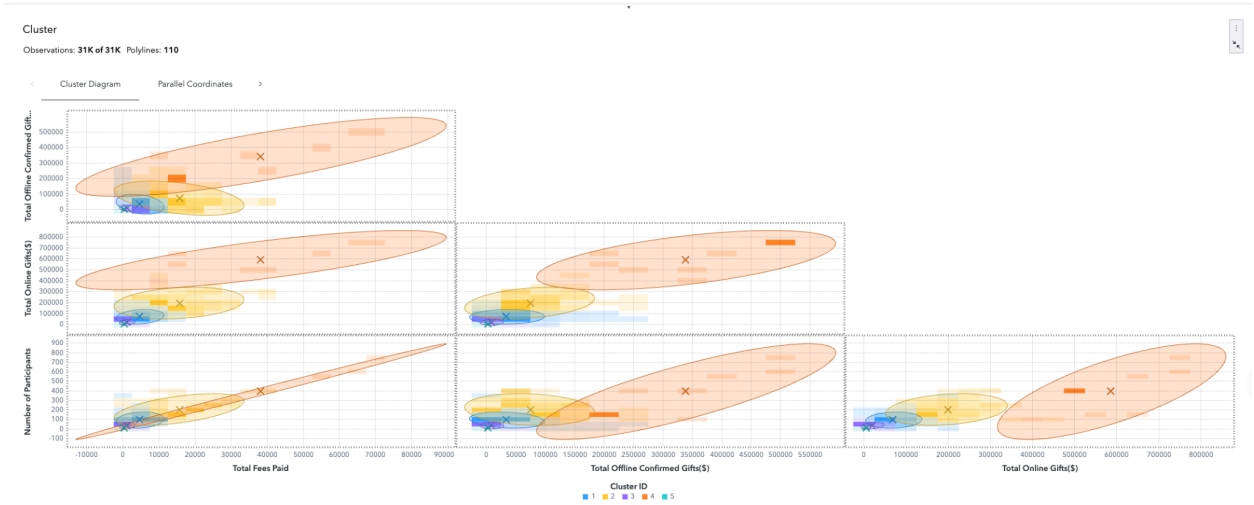
Cluster ID	Observations	RMS of STD	Within cluster SS	Min centroid-to-observation	Max centroid-to-observation	Nearest Cluster	Centroid Distance	Average Distance
1	2,899	1.6953127069	8331.9729197	0.145323376	5.5917663944	3	2.171511938	1.4700784173
2	490	5.0818998579	12654.596021	1.1288378031	17.987002353	1	6.1745730639	4.4683300839
3	27,473	0.3787807731	3941.6852143	0.0143435171	2.6362085707	1	2.171511938	0.2969165781
4	63	15.733024081	15594.266944	1.4406328558	55.800359855	2	17.075190564	12.550674406



Cluster ID	Total Fees Paid	Total Offline Confirmed Gifts($)	Total Online Gifts($)	Number of Participants
1	1466.6967816	10887.755643	24047.030445	37.85374267
2	6243.0516122	42652.794571	87858.209082	108.49795918
3	198.56500965	930.79496852	2593.1642638	5.8313980999
4	21765.626825	118720.65905	285346.52111	260.53968254



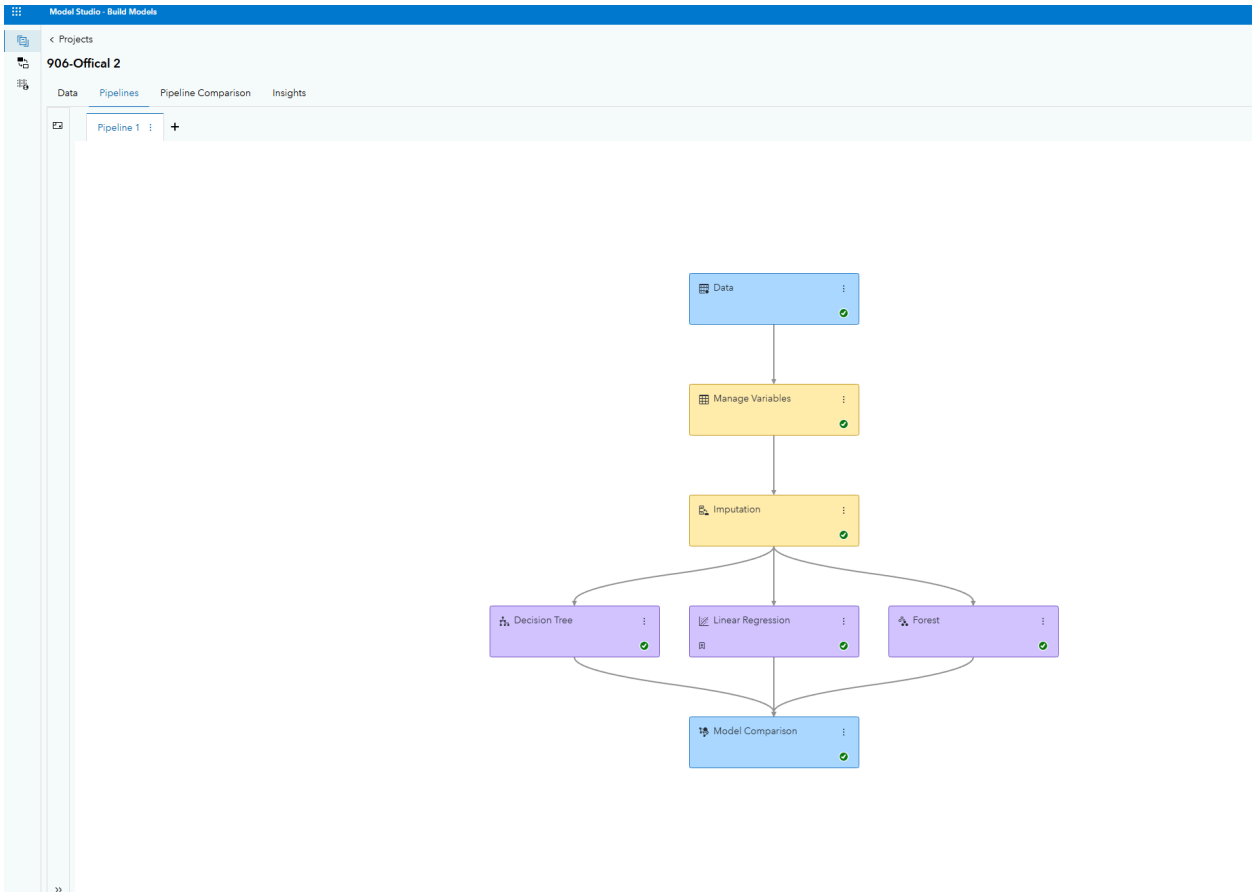
Appendix 1.3: K-means =5



Centroids | Cluster Summary | Model Information | Within Cluster Statistics | Iteration History | Standardization | Interval information | Parallel Coordinates Plot

Cluster ID	Observations	RMS of STD	Within cluster SS	Min centroid-to-observation	Max centroid-to-observation	Nearest Cluster	Centroid Distance	Average Distance
1	607	4.1171622007	10289.271924	0.578364785	18.374634542	3	4.8939804236	3.6213606827
2	114	8.6111306683	8453.2791381	2.153906249	19.540753794	1	11.141604941	7.7923864126
3	3,150	1.4413780117	6544.3473035	0.0544863818	5.4596856165	5	1.8812307521	1.254238589
4	8	21.012869972	3532.3256356	4.2634124619	30.258900377	2	35.585325211	19.396584258
5	27,046	0.3505426134	3323.4158294	0.0254438946	2.4498515153	3	1.8812307521	0.2778320848

Appendix 2.1: Build Model

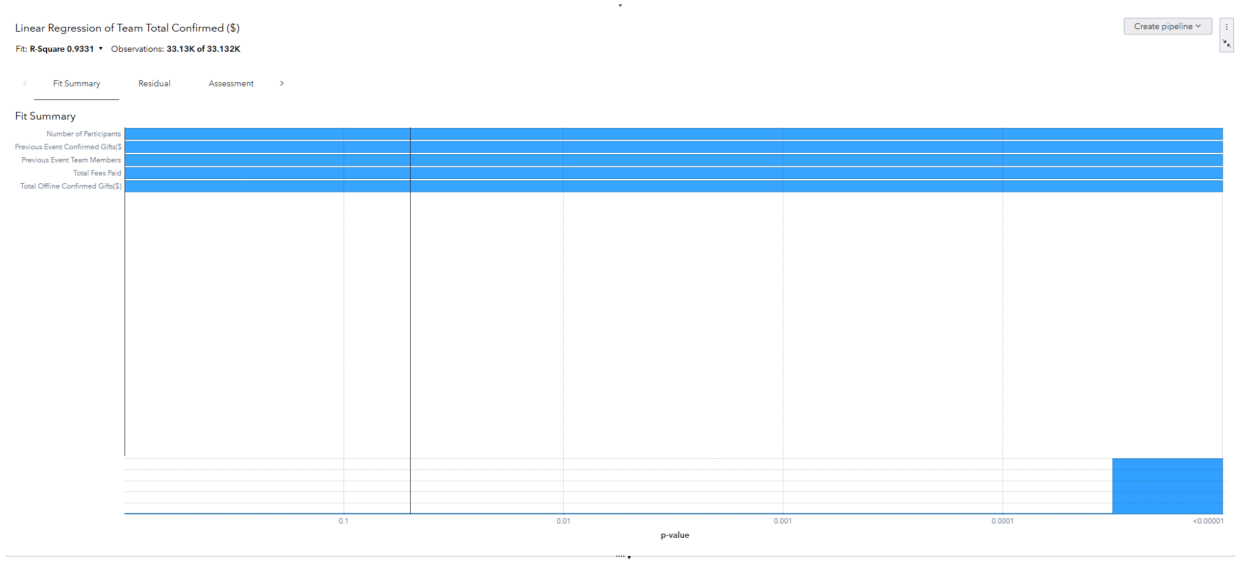


Appendix 2.2: Model Comparison

Model Comparison

Champion	Name	Algorithm Name	Average Squared Error	Data Role	Number of Observations	Root Average Squared Error	Root Mean Absolute Error	Root Mean Squared Logarithmic Error
*	Linear Regression	Linear Regression	60,896,312.0875	VALIDATE	6,626	7,803.6089	53.3605	1.6214
	Decision Tree	Decision Tree	167,083,429.4470	VALIDATE	6,626	12,926.0756	55.2463	1.8898
	Forest	Forest	164,093,687.8800	VALIDATE	6,626	12,809.9058	53.7013	1.7538

Appendix 2.3: Linear Regression



Dimensions | Overall ANOVA | Fit Statistics | Parameter Estimates | Type III Test | Assessment | Assessment Statistics | Assessment Summary

Source	Deg Freedom	Sum of Squares	Mean Square	F Value	Pr > F	R-Square
Model	5	2.503E13	5.007E12	92335.48	<0.00001	0.933056
Error	33124	1.796E12	54223381	.	.	.
Corrected Total	33129	2.683E13	.	.	.	.

Dimensions | Overall ANOVA | Fit Statistics | Parameter Estimates | Type III Test | Assessment | Assessment Statistics | Assessment Summary

Statistic	Value
Mean Square Error	54223381
Root MSE	7363.653
F Value for Model	92335.48
Pr > F	<0.00001
R-Square	0.933056
Adjusted R-square	0.933046
AIC	623137.7
AICC	623137.7
SBC	590056.1

Dimensions | Overall ANOVA | Fit Statistics | Parameter Estimates | Type III Test | Assessment | Assessment Statistics | Assessment Summary

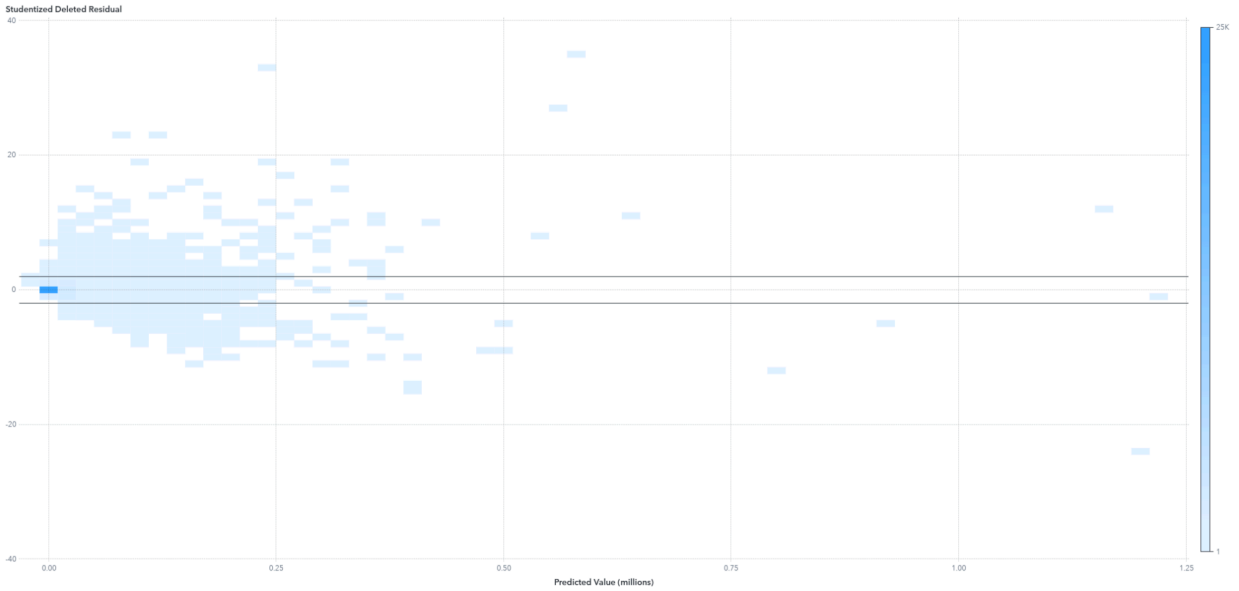
Parameter	Estimate	Standard Error	t Value	Pr > |t|
Intercept	-448.965	45.91729	-9.77768	<0.00001
Total Offline Confirmed Gifts($)	1.373915	0.006028	227.9084	<0.00001
Previous Event Confirmed Gifts($	0.337398	0.004028	83.76521	<0.00001
Previous Event Team Members	-308.774	5.456808	-56.5852	<0.00001
Total Fees Paid	4.089072	0.047855	85.44733	<0.00001
Number of Participants	364.7469	3.865702	94.35464	<0.00001

Linear Regression of Team Total Confirmed ($)

Fit: **R-Square 0.9331** ▾ Observations: **33.13K of 33.132K**

‹ Fit Summary Residual Assessment ›

Residual Plot



Linear Regression of Team Total Confirmed ($)

Fit: **R-Square 0.9331** ▾ Observations: **33.13K of 33.132K**

‹ Fit Summary Residual Assessment ›

Assessment