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FDA Assignment 3

1) Model Evaluation based on new Features.

My objective to enhance clustering quality and obtain meaningful customer segments drove me to create three new features which include Income to TRB, Age income interaction and TRB_squared. The income to trb ratio demonstrates the effectiveness of customer financial management with respect to savings. Age income interaction reveals patterns of financial behavior according to customer age. The last variable included in the analysis was Trb squared because it reveals higher amounts of capital decrease and enhances extreme balance recognition. After examining the three features of Age, income, and TRB, the K-Means clustering algorithm generated a silhouette score of 0.66 on our optimal K that is 3. The silhouette score increased to 0.80 when the engineering features and normalization were included, indicating that the clusters became more compact and distinct. The implementation of additional features strengthened the cluster model ability to identify different client categories.

2) Segmentation of customers to enhance CCLM strategy.

The K-Means segmentation techniques identified three different customer groups exhibiting unique behaviors which indicate different lifecycle approaches. Cluster 0 consists of mass-market users with moderate income and high digital activity, ideal for automation and self-service journeys. Members of Cluster 1 experienced low product usage despite their digital involvement because they belong to the low-income category and thus need customized digital onboarding education and encouraging notifications to boost their engagement levels. High-net-worth non-digital users who demonstrate high TRB, yet weak digital interaction belong to Cluster 2 which represents an ideal market segment for relationship-based wealth advisory and personalized services. The customer analysis provides HSBC with data which enables personalized lifecycle engagement starting from onboarding until retention. Segmentation enables organizations to utilize data positioning for making actionable choices about their products and services as they expand their cross-sell possibilities throughout the customer journey.

3) Top down and bottom-up approach.

The K-Means clustering results provided important insights into the distinctions between conventional top-down and alternative bottom-up market segmentation strategies. The top-down strategy utilized by HSBC would segment customers through income or age alone although those factors do not necessarily reflect their needs or behavior. The procedure results in errors that misallocate or discredit essential customer distinctions. Our bottom-up approach did not establish any initial assumptions thus it relied on actual client data usage patterns along with newly engineered product features to determine customer clusters. Through K-Means segmentation analysis HSBC discovered a compact profitable segment with elevated funds and earnings, yet they used digital channels infrequently which would otherwise be undetectable using income brackets alone. By adopting this method HSBC obtained behavioral insights which let them create personalized strategies that go further than demographic-based customer profiling.

4) Pakistan financial Institution – UBL.

The customer segmentation strategy at UBL will follow the model implemented by HSBC to achieve modern segmentation while improving targeting accuracy. Through the development of features Age income interaction, Income to TRB and product usage patterns we can identify behavioral segments including digital-first youth dormancy among high-income clients and underserved mass-market population. This would lead to optimized relationship management targeting the small cluster with high deposits but low product adoption in Cluster 2 for potential insurance and investment cross-sales. The demographic group of digitally active low-income customers will find value in micro-loans delivered through mobile applications and basic savings features. The analytical data would help UBL create improved customer lifecycle programs and better products alongside retention strategies. By using behavior-based clustering, UBL can move from normal banking procedures to customized service approaches.