Model Summary

Train set:
Accuracy = 0.84
Sensitivity = 0.81
Specificity = 0.83

Test set :
Accuracy = 0.78
Sensitivity = 0.82
Specificity = 0.78

The model is performing well on the test set, having learned effectively from the training set.

Final conclusion with no PCA

The logistic model without PCA demonstrates good sensitivity and accuracy, comparable to the models with PCA. Therefore, we can opt for the simpler logistic regression model with PCA, as it highlights the key predictor variables and their significance. This approach not only provides insights into the important factors but also helps identify which variables should be targeted when deciding on customers likely to churn. As a result, the model is more valuable for business decision-making and explanation.

Business recommendation

Top predictors:

Below are few top variables selected in the logistic regression model.

Variables	Coefficients
loc_ic_mou_8	-3.3287
og_others_7	-2.4711
ic_others_8	-1.5131
isd_og_mou_8	-1.3811
decrease_vbc_action	-1.3293
monthly_3g_8	-1.0943
std_ic_t2f_mou_8	-0.9503
monthly_2g_8	-0.9279
loc_ic_t2f_mou_8	-0.7102
roam_og_mou_8	0.7135

We observe that most of the top variables have negative coefficients, indicating an inverse correlation with the probability of churn.

For example:

If the local incoming minutes of usage (loc_ic_mou_8) are lower in August compared to other months, the likelihood of customer churn increases.

Recommendations:

- Target customers with lower local incoming minutes and outgoing ISD call minutes during the action phase, particularly in August.
- Focus on customers with lower outgoing charges in July and incoming charges in August.
- Customers who experience an increase in value-based costs during the action phase are more likely to churn, so offering them incentives could be effective.
- Customers with higher 3G recharge amounts in August are more likely to churn.
- Customers with decreasing STD incoming minutes for operators T to fixed lines in August are at a higher risk of churning.
- Customers with a decline in monthly 2G usage in August are also more likely to churn.
- Customers with a reduction in incoming minutes for operators T to fixed lines in August are more prone to churn.

Additionally, the variable *roam_og_mou_8* shows a positive coefficient (0.7135), indicating that customers with increasing roaming outgoing minutes are more likely to churn.