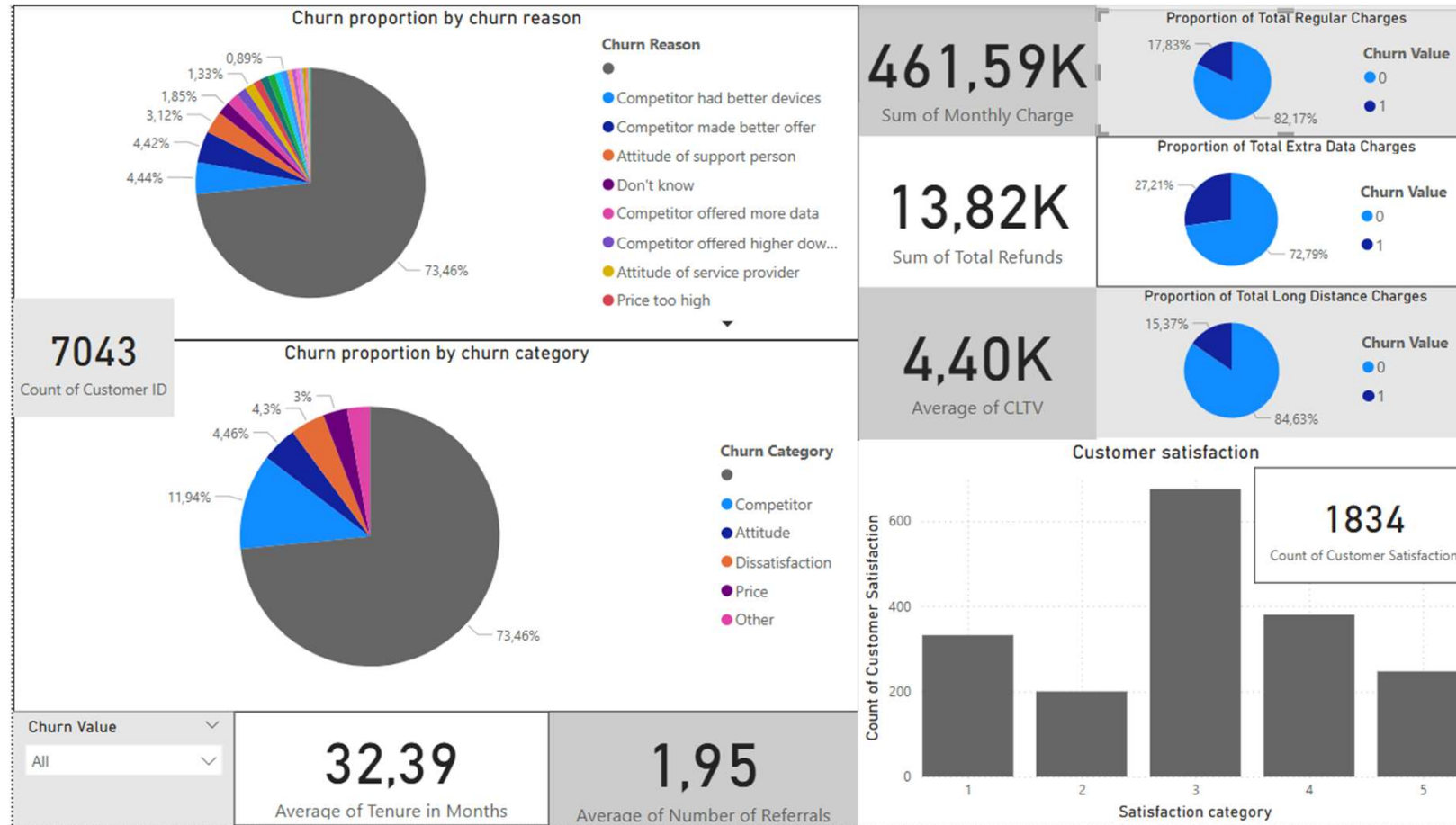


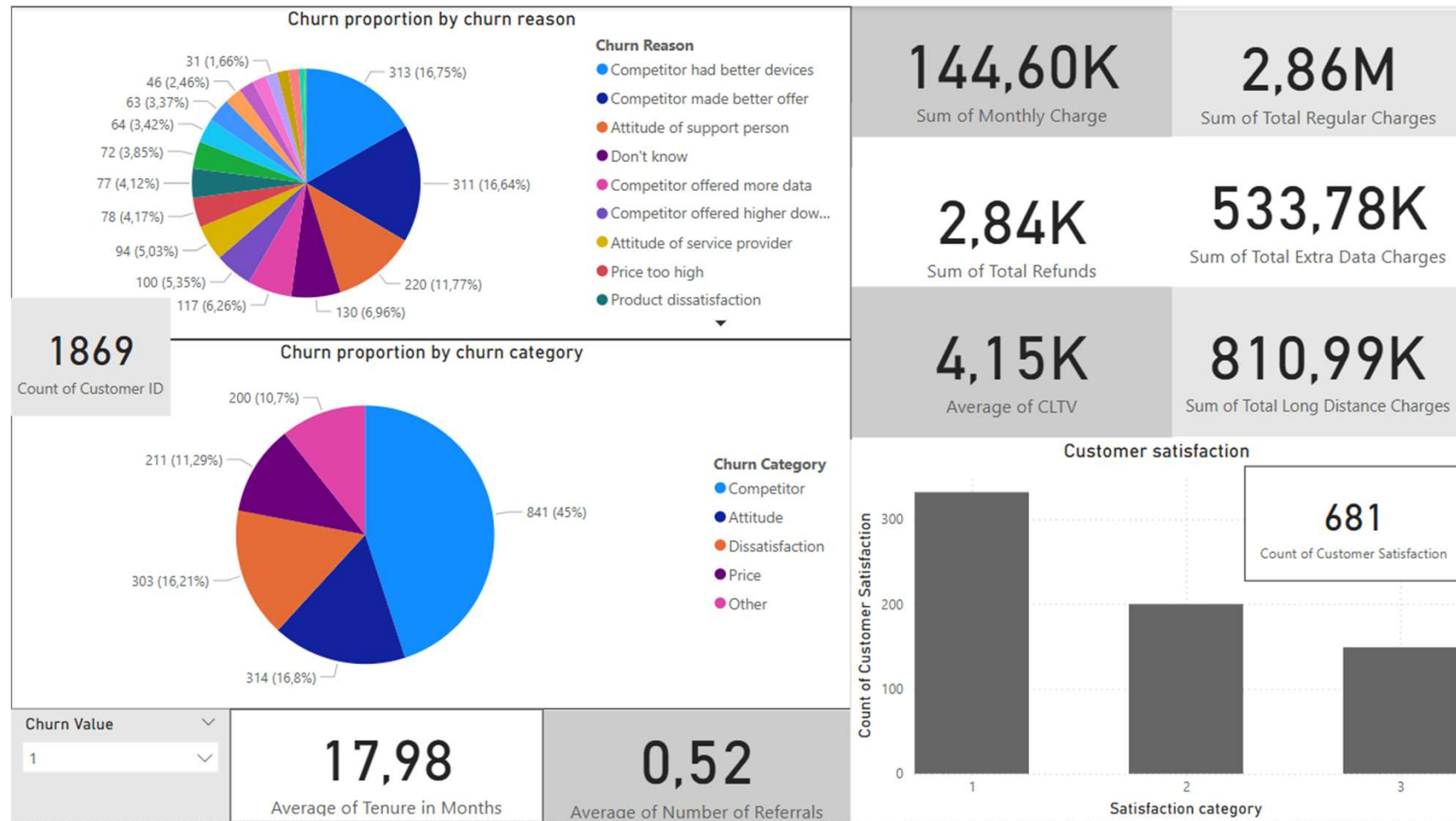
# Statistical analysis of churn data

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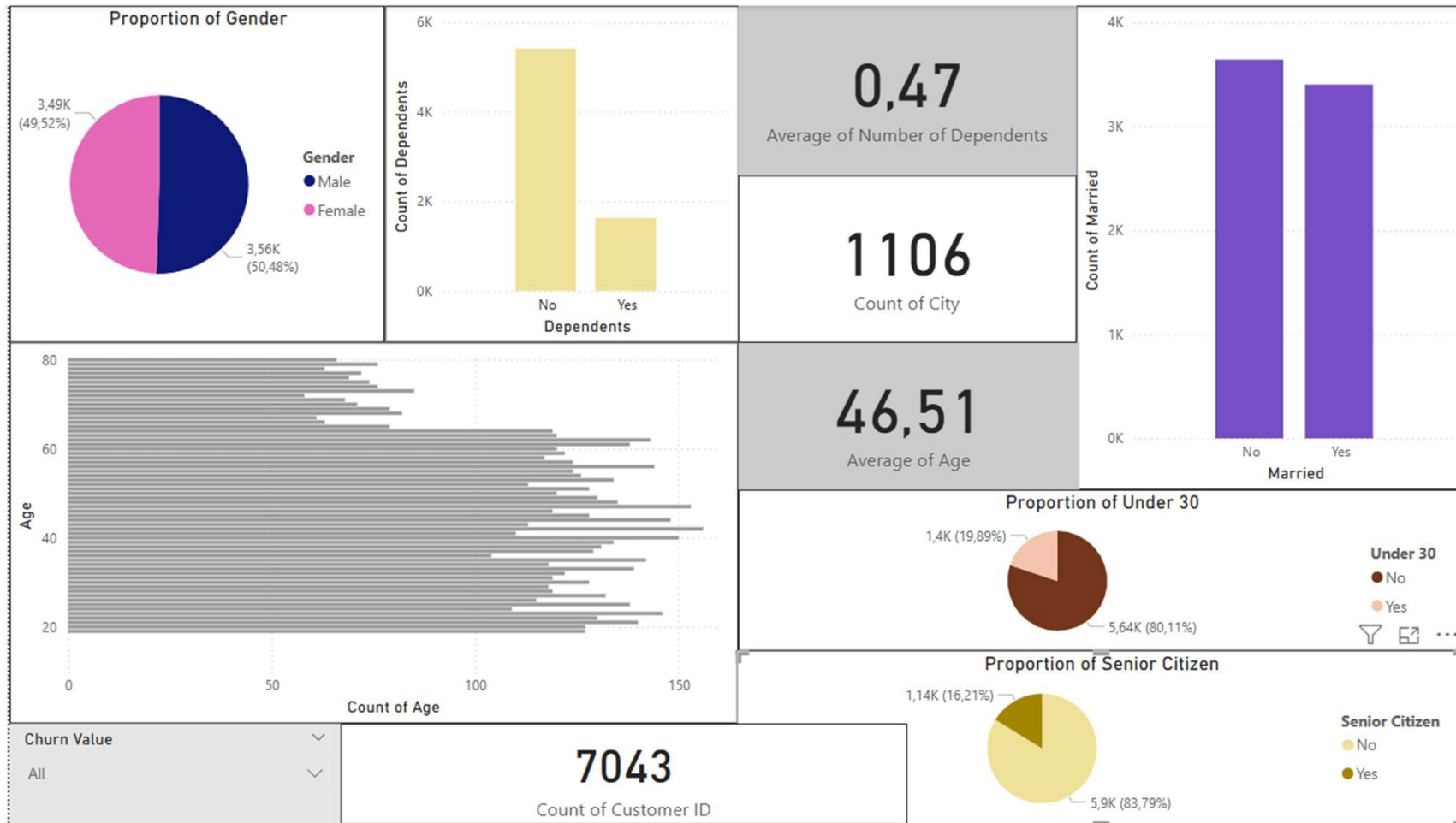
# Dataset presentation: All customers



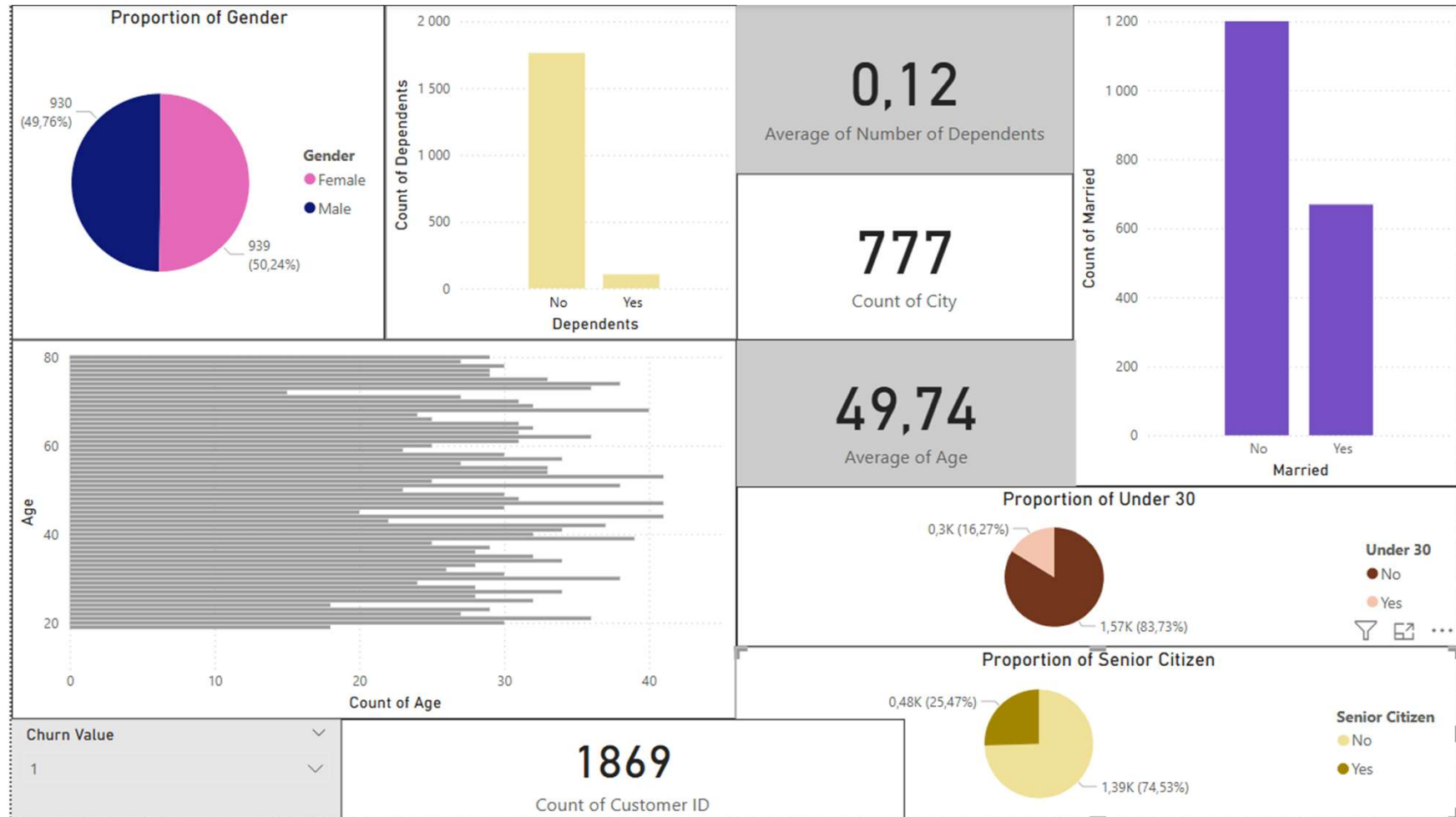
## Dataset presentation: Left customers



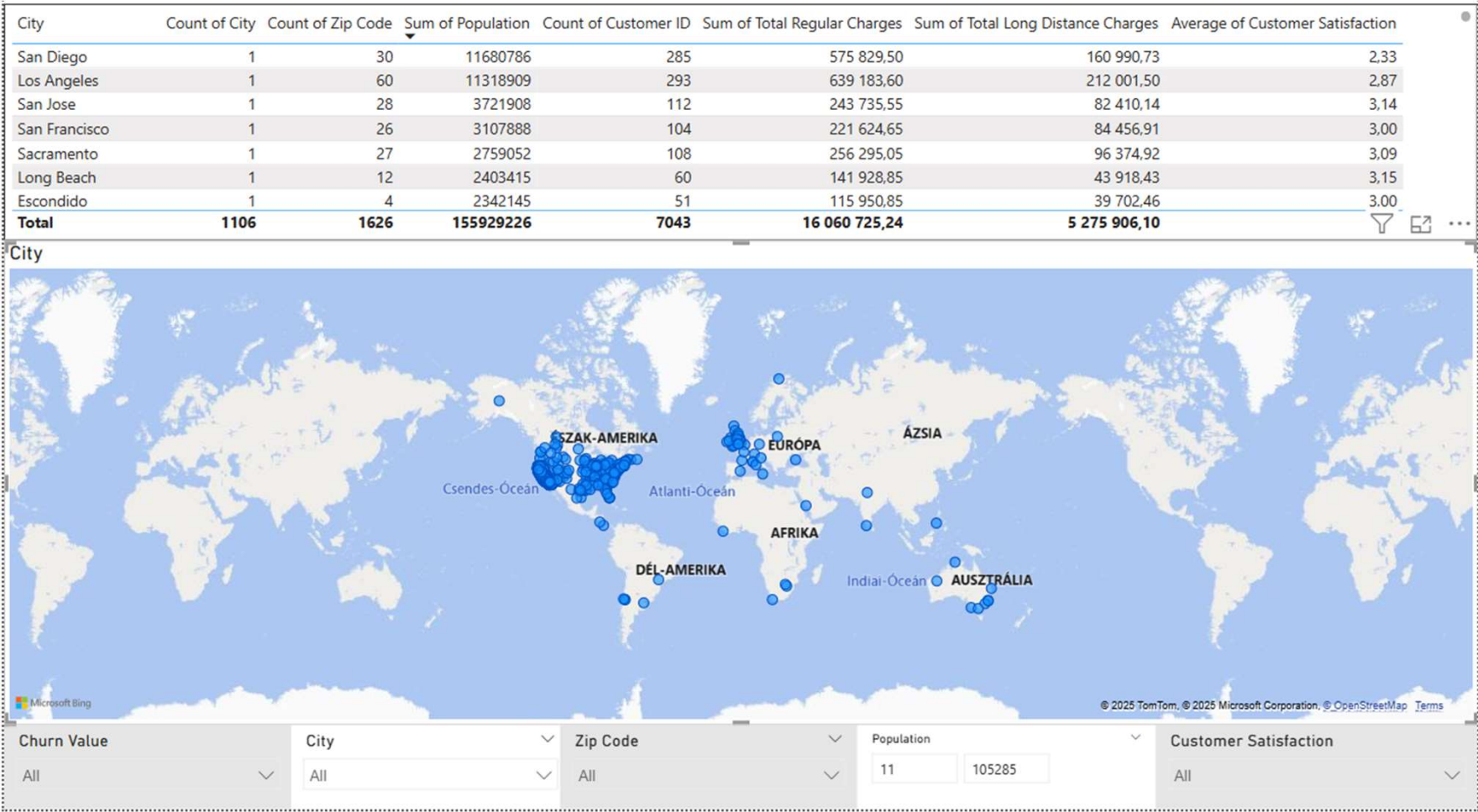
## Dataset presentation: All customers



## Dataset presentation: Left customers

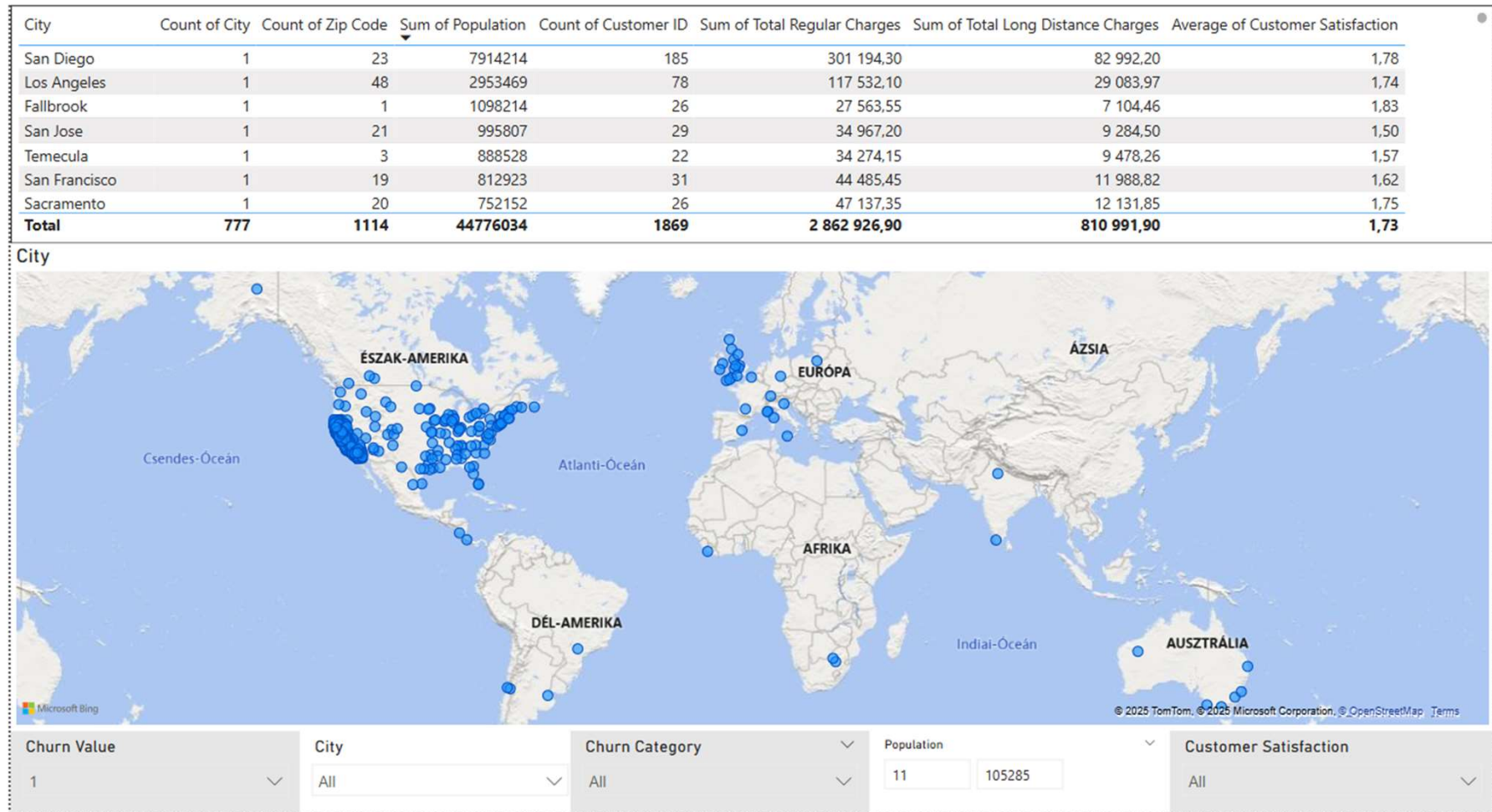


# Dataset presentation: All customers

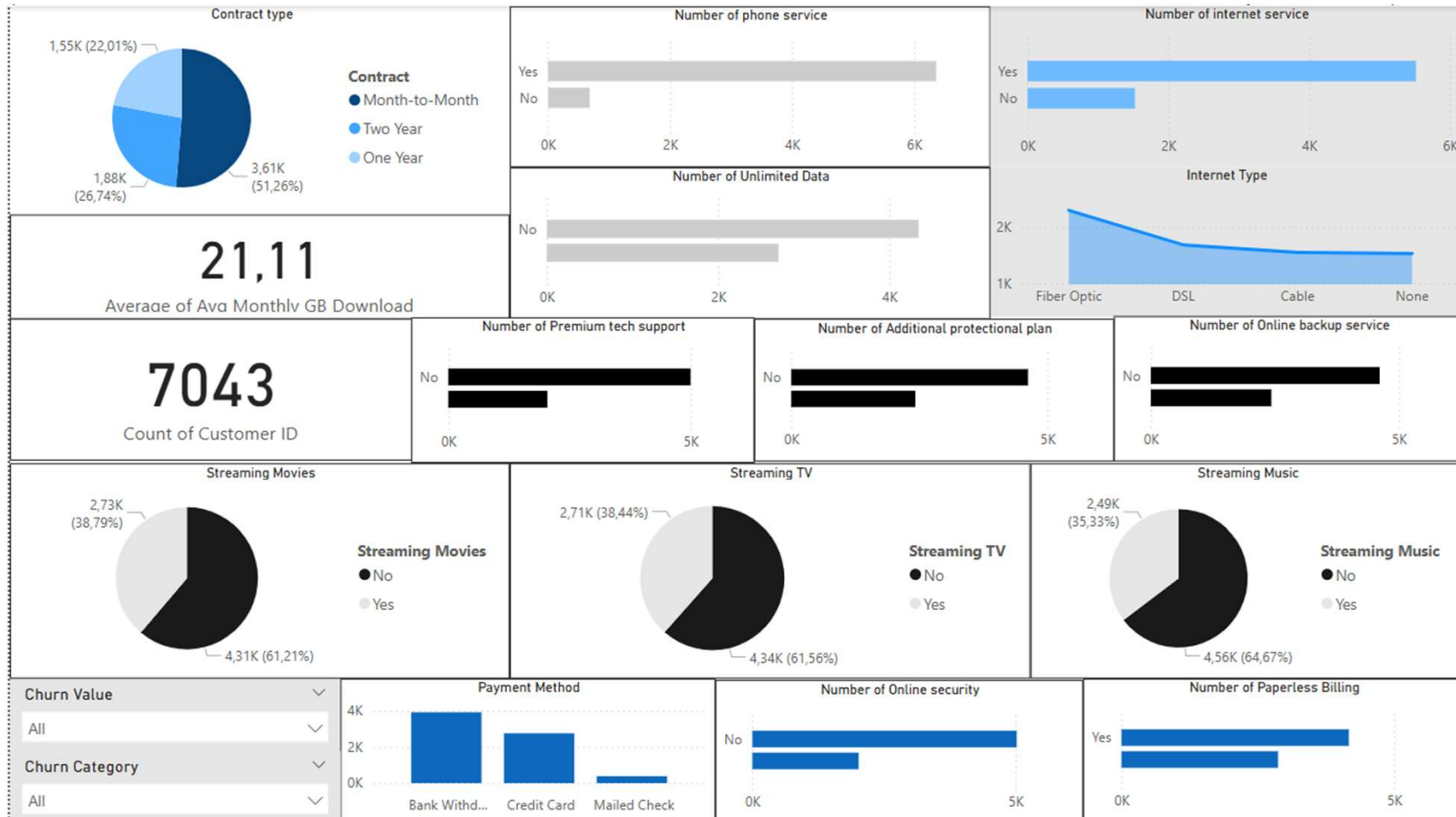




## Dataset presentation: Left customers

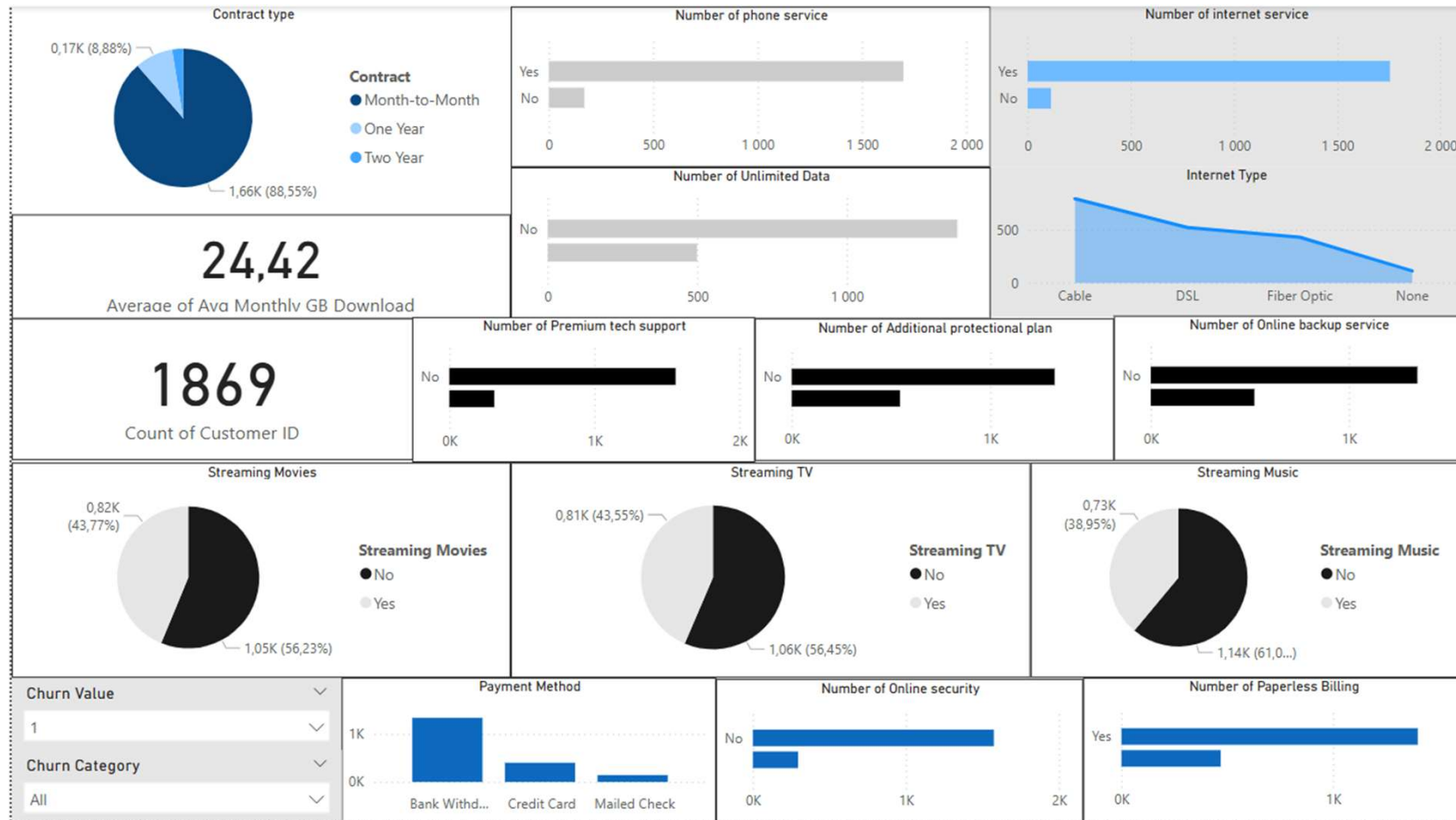


# Dataset presentation: All customers

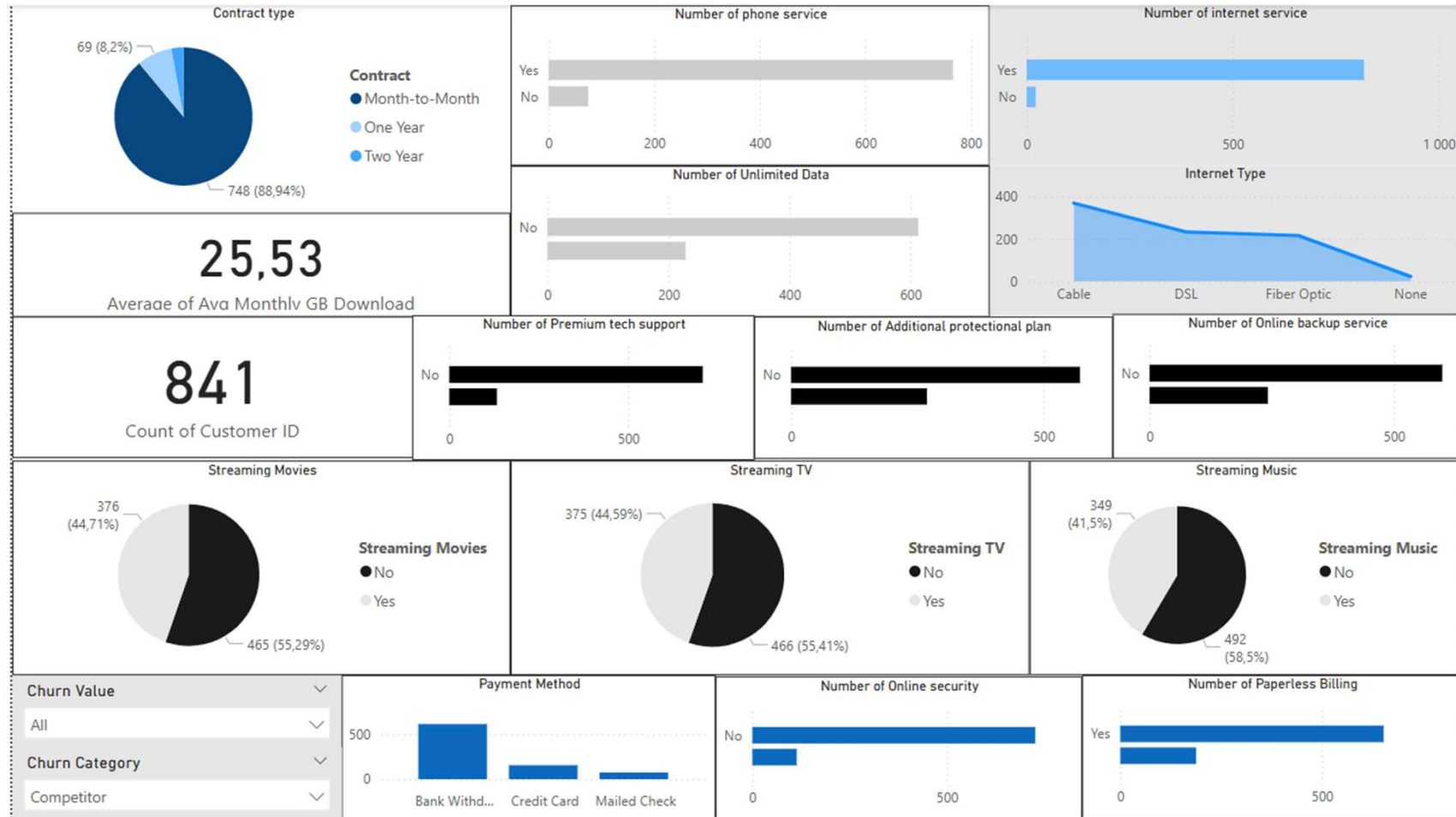




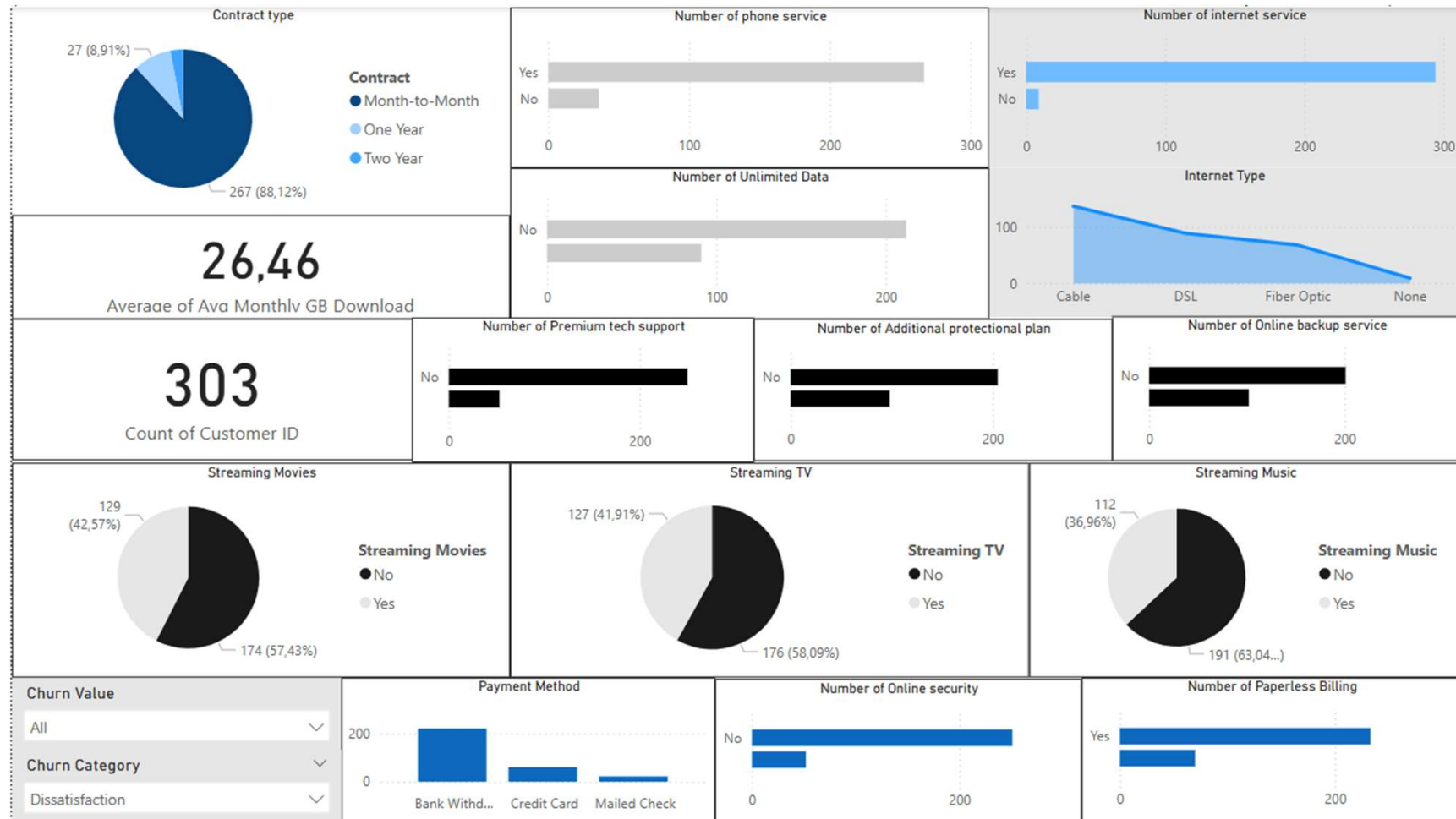
# Dataset presentation: All customers



## Dataset presentation: Left due to competitors



## Dataset presentation: Left due to dissatisfaction



## Dataset presentation: Left due to price



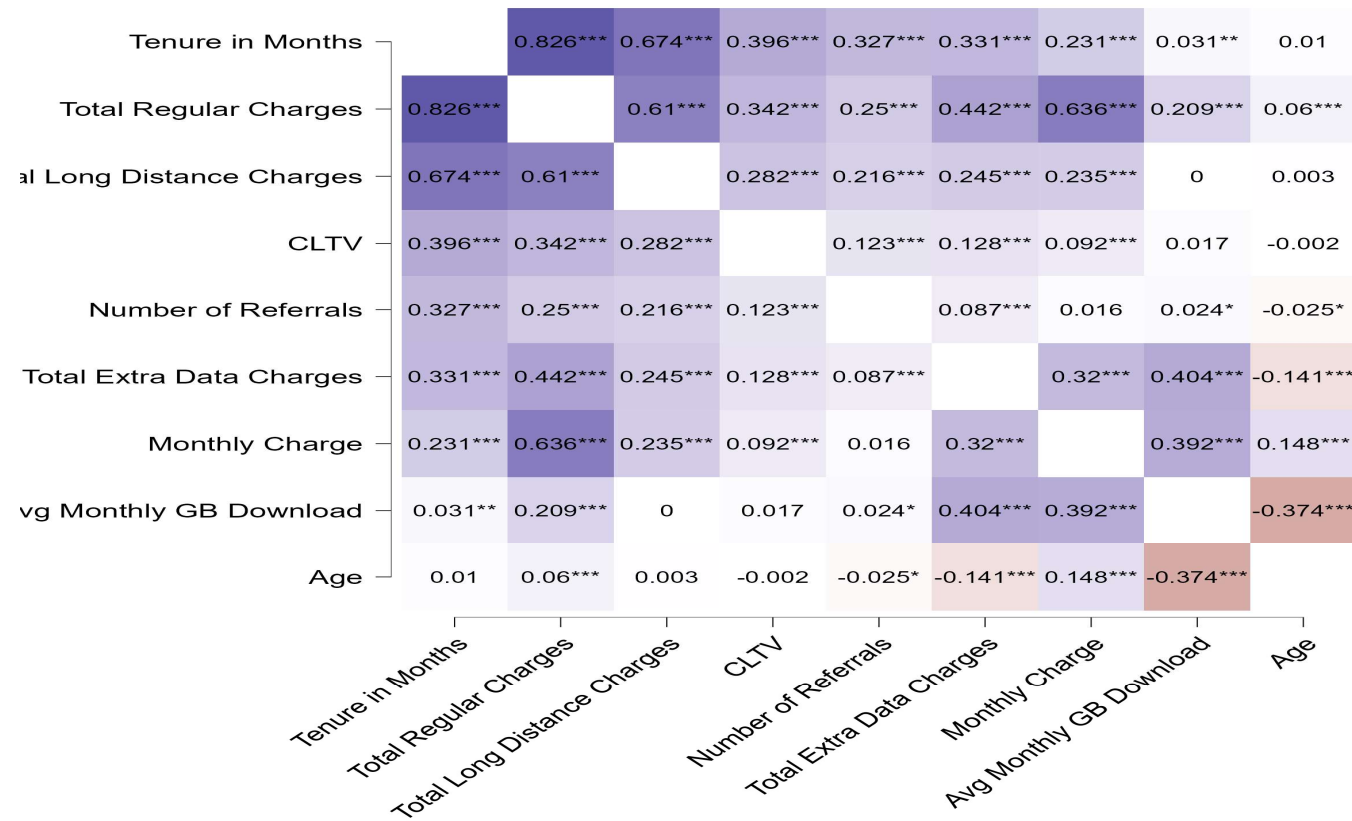
# Examining factors influencing the likelihood of leaving

Coefficients

Model		Estimate	Standard Error	Odds Ratio	z	Wald Test		
						Wald Statistic	df	p
M <sub>0</sub>	(Intercept)	-1.018	0.027	0.361	-37.730	1423.578	1	< .001
M <sub>1</sub>	(Intercept)	-9.311	0.399	9.038×10 <sup>-5</sup>	-23.350	545.224	1	< .001
	Number of Referrals	-0.596	0.039	0.551	-15.125	228.754	1	< .001
	Avg Monthly GB Download	0.008	0.003	1.008	2.652	7.035	1	0.008
	Streaming Movies (No)	0.583	0.163	1.792	3.569	12.737	1	< .001
	Streaming Music (Yes)	0.409	0.160	1.505	2.549	6.496	1	0.011
	Tenure in Months	-0.031	0.003	0.969	-11.146	124.227	1	< .001
	Online Security (No)	0.450	0.099	1.568	4.554	20.738	1	< .001
	Device Protection Plan (No)	0.189	0.096	1.208	1.972	3.890	1	0.049
	Premium Tech Support (No)	0.504	0.099	1.656	5.082	25.827	1	< .001
	Contract (One Year)	1.090	0.188	2.973	5.799	33.632	1	< .001
	Contract (Month-to-Month)	2.445	0.181	11.535	13.479	181.696	1	< .001
	Monthly Charge	0.043	0.003	1.044	16.516	272.783	1	< .001
	Total Extra Data Charges	0.000	0.000	1.000	2.326	5.411	1	0.020
	Senior Citizen (Yes)	0.746	0.120	2.108	6.207	38.521	1	< .001
	Referred a Friend (Yes)	1.908	0.128	6.738	14.933	223.004	1	< .001
	Phone Service (No)	1.445	0.156	4.243	9.276	86.043	1	< .001
	Online Backup (No)	0.329	0.093	1.389	3.555	12.641	1	< .001
	Unlimited Data (No)	1.256	0.091	3.513	13.822	191.059	1	< .001
	Paperless Billing (Yes)	0.197	0.086	1.217	2.281	5.205	1	0.023
	Dependents (No)	1.534	0.137	4.634	11.183	125.053	1	< .001
	Payment Method (Credit Card)	-0.314	0.089	0.731	-3.534	12.486	1	< .001
	Payment Method (Mailed Check)	0.784	0.158	2.191	4.978	24.781	1	< .001
	Under 30 (Yes)	-0.499	0.138	0.607	-3.602	12.976	1	< .001

Note. Churn Value level 'left' coded as class 1.

## Heatmap: Continuous variables correlation with customer lifetime





## Customer lifetime in each satisfaction category

ANOVA - Tenure in Months

Cases	Sum of Squares	df	Mean Square	F	p
Customer Satisfaction	149974.411	4	37493.603	72.108	< .001
Residuals	951018.584	1829	519.966		

Note. Type III Sum of Squares

## Descriptives

Descriptives - Tenure in Months

Customer Satisfaction	N	Mean	SD	SE	Coefficient of variation
1	332	16.392	18.620	1.022	1.136
2	200	18.665	19.562	1.383	1.048
3	675	35.433	24.761	0.953	0.699
4	380	40.303	23.999	1.231	0.595
5	247	34.211	22.863	1.455	0.668

## Variables linearly related to customer lifetime

M <sub>9</sub>	(Intercept)	20.577	0.614		33.506	< .001
	Total Regular Charges	0.011	$9.120 \times 10^{-5}$	0.974	115.708	< .001
	Monthly Charge	-0.347	0.005	-0.433	-67.288	< .001
	Total Long Distance Charges	0.004	$1.753 \times 10^{-4}$	0.153	25.296	< .001
	Referred a Friend (Yes)	2.237	0.329		6.801	< .001
	CLTV	0.001	$1.039 \times 10^{-4}$	0.053	10.589	< .001
	Total Refunds	0.085	0.014	0.027	5.915	< .001
	Age	0.021	0.007	0.014	2.931	0.003
	Number of Referrals	0.154	0.054	0.019	2.845	0.004
	Total Extra Data Charges	$-4.079 \times 10^{-4}$	$1.888 \times 10^{-4}$	-0.011	-2.161	0.031

<sup>a</sup> Standardized coefficients can only be computed for continuous predictors.