

PARK SUNG JOON

CREDIT CARD ATTRITIONS – AN ANALYTICAL INSIGHT





PROBLEM STATEMENT

Our client is a business manager of a consumer credit card portfolio who is currently facing problems of customer attrition.

Key Requests:

- Reasons behind attritions
- Recommendations to prevent attritions based on data evidence



DATA SET

Looking at the dataset, here are some key columns identified to assist in forming our hypothesis

1. Various customer information

- Age, gender, education level, marital status, income are provided
- Describes the **demographic** of customers

2. Credit card usage information

- Card category shows the various **products** provided by the bank
- Months on book shows the **relationship** period with the bank
- Various **interaction metrics** such as months inactive, contacts count, total transaction amount changes, transaction amount, transaction count and transaction count changes are shared

HYPOTHESIS

Observing the data provided, here are several curated hypothesis to guide the investigation into the reasons for attrition

1. Customers background such as their **income** could affect the degree of attritions
2. Based on **each product**, the attrition rate will differ
3. Key bank interaction metric such as **bank contacts** and **customer transactions** will affect the attrition rates

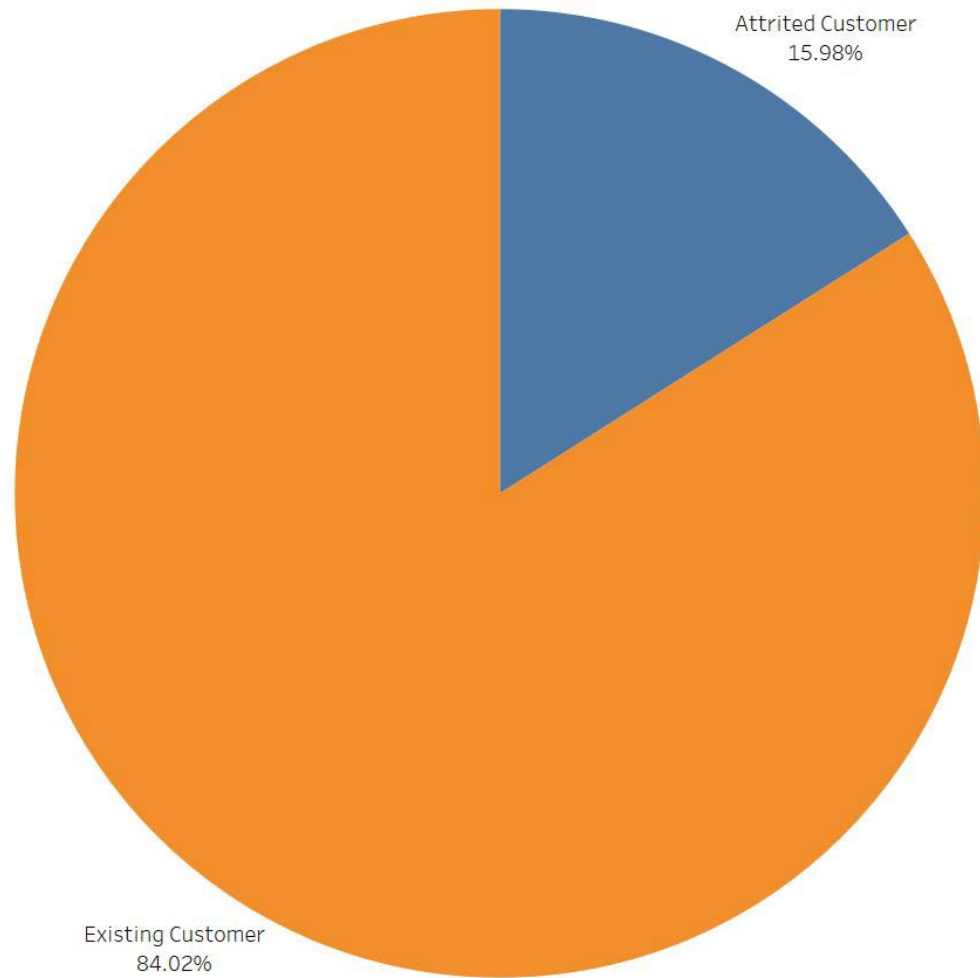


DATA ANALYSIS STRATEGY

1. Observe the **overall** attrition rate
2. Identify **demographic** effects
3. Identify bank and customer interaction effects – this indicate **how** either the bank engage their customers or how customers use the bank
4. Observe their **interactive effects** on attrition rate
5. Provide **insights** and **recommendations**



ATTRITION RATE



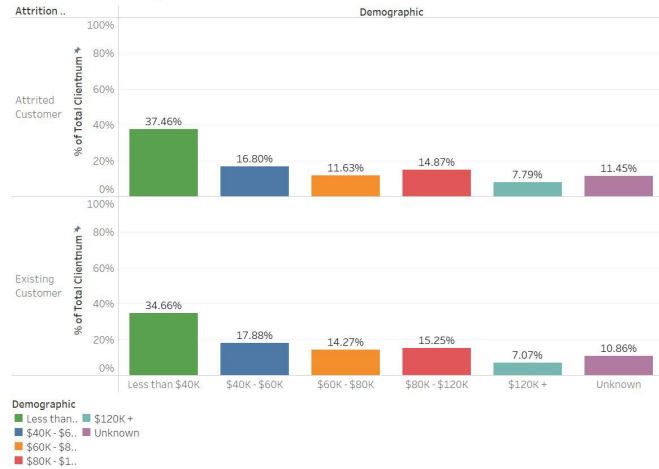
15.98%

OF CUSTOMERS HAVE
ATTRITED THEIR
ACCOUNTS

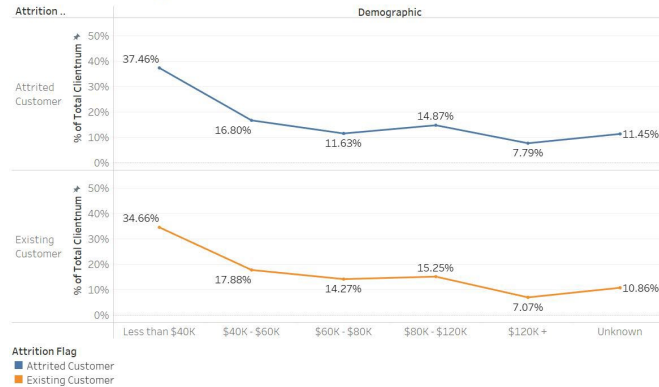
Income category	Earning less than \$40k
Card category	Blue card seems to have the highest attrition rate
Customer age range	Age ranges from 41-45
Education level	Mostly belongs to graduates
Marital status	Are married
Gender	Mostly Female

DEMOGRAPHIC EFFECTS

Demo effect - Bar plot

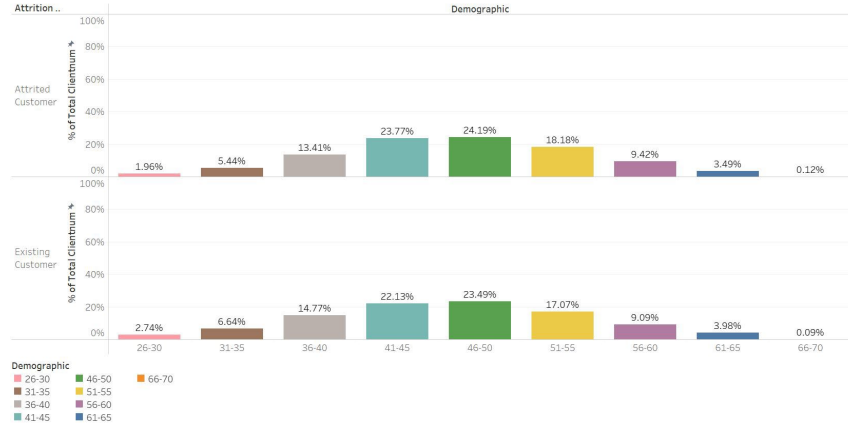


Demo effect - Line plot

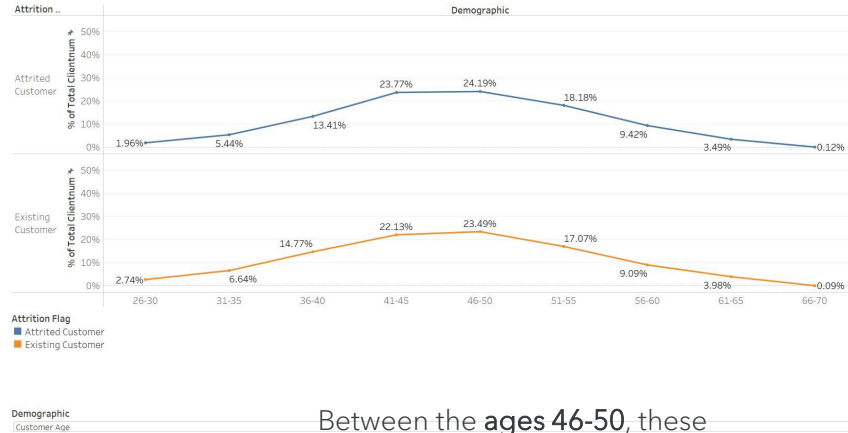


Those who earn less than \$40k a year attrites the most. Should we provide more incentives to this group?

Demo effect - Bar plot

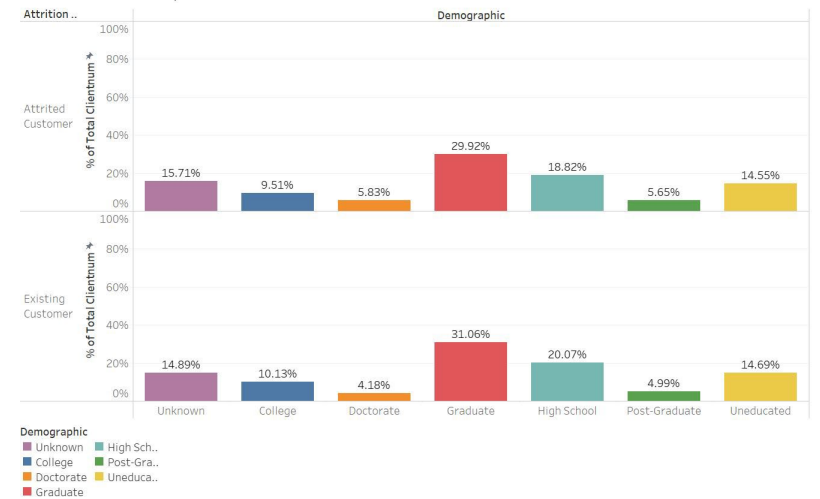


Demo effect - Line plot

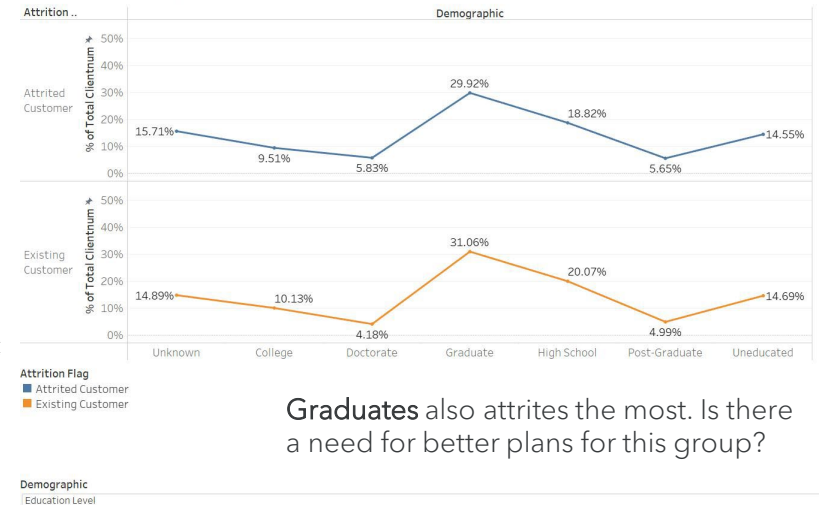


Between the ages 46-50, these customers attrites the most.

Demo effect - Bar plot



Demo effect - Line plot



Graduates also attrites the most. Is there a need for better plans for this group?

However, more insights are required as these could be just correlations and not cause and effect relationships

AMONG THE DEMOGRAPHIC FACTORS, INCOME CATEGORY, CUSTOMER AGE AND EDUCATION LEVEL PROVIDES MOST INSIGHTS

BANK – CUSTOMER INTERACTION EFFECTS

Credit limit

Attrition variables analysis - Heat map

Income..	Card Cate..	Attrition Flag	
		Attritted Customer	Existing Customer
Less than \$40K	Platinum	15,987	15,987
	Gold	15,437	15,786
	Silver	12,359	12,229
	Blue	3,056	3,388
\$40K - \$60K	Platinum	23,981	
	Gold	23,981	22,159
	Silver	15,866	17,657
	Blue	4,366	4,631
\$60K - \$80K	Platinum		34,516
	Gold	34,516	33,286
	Silver	30,064	29,553
	Blue	8,402	8,797
\$80K - \$120K	Platinum		34,516
	Gold	34,516	34,516
	Silver	34,516	34,516
	Blue	12,883	14,124
\$120K +	Platinum		34,516
	Gold	34,516	33,292
	Silver	34,516	34,116
	Blue	18,034	17,868

Months Inactive (12 mon)

Attrition variables analysis - Heat map

Income..	Card Cate..	Attrition Flag	
		Attritted Customer	Existing Customer
Less than \$40K	Platinum	2,500	2,500
	Gold	2,750	2,750
	Silver	2,450	2,227
	Blue	2,686	2,302
\$40K - \$60K	Platinum	3,000	
	Gold	2,500	1,923
	Silver	2,364	2,068
	Blue	2,696	2,238
\$60K - \$80K	Platinum		2,250
	Gold	3,000	2,000
	Silver	3,091	2,353
	Blue	2,657	2,272
\$80K - \$120K	Platinum		2,000
	Gold	2,600	2,000
	Silver	2,727	2,179
	Blue	2,698	2,268
\$120K +	Platinum		2,250
	Gold	1,500	2,688
	Silver	2,818	2,306
	Blue	2,761	2,226

Months on book

Attrition variables analysis - Heat map

Income..	Card Cate..	Attrition Flag	
		Attritted Customer	Existing Customer
Less than \$40K	Platinum	39.50	35.50
	Gold	36.25	34.30
	Silver	36.90	34.54
	Blue	36.00	35.91
\$40K - \$60K	Platinum	31.00	
	Gold	31.00	32.46
	Silver	35.45	36.44
	Blue	35.84	35.89
\$60K - \$80K	Platinum		33.50
	Gold	34.00	35.65
	Silver	36.73	35.26
	Blue	36.10	35.55
\$80K - \$120K	Platinum		40.50
	Gold	39.40	36.88
	Silver	35.73	35.26
	Blue	36.31	36.07
\$120K +	Platinum		34.25
	Gold	21.00	38.00
	Silver	38.45	36.51
	Blue	36.97	36.92

Total amt change Q4 Q1

Attrition variables analysis - Heat map

Income..	Card Cate..	Attrition Flag	
		Attritted Customer	Existing Customer
Less than \$40K	Platinum	0.6310	0.7225
	Gold	0.7233	0.7347
	Silver	0.7075	0.7852
	Blue	0.6860	0.7655
\$40K - \$60K	Platinum	0.9870	
	Gold	0.5605	0.7639
	Silver	0.6417	0.7732
	Blue	0.6786	0.7743
\$60K - \$80K	Platinum		0.7900
	Gold	0.8172	0.7392
	Silver	0.7433	0.7494
	Blue	0.6992	0.7860
\$80K - \$120K	Platinum		0.7450
	Gold	0.8332	0.7774
	Silver	0.6990	0.7732
	Blue	0.7108	0.7772
\$120K +	Platinum		0.7800
	Gold	0.9935	0.8743
	Silver	0.7156	0.7678
	Blue	0.6973	0.7587

Total ct change Q4 Q1

Attrition variables analysis - Heat map

Income..	Card Cate..	Attrition Flag	
		Attritted Customer	Existing Customer
Less than \$40K	Platinum	0.5420	0.7445
	Gold	0.5930	0.7335
	Silver	0.5966	0.7304
	Blue	0.5410	0.7475
\$40K - \$60K	Platinum	0.5120	
	Gold	0.6445	0.7182
	Silver	0.5690	0.7131
	Blue	0.5583	0.7400
\$60K - \$80K	Platinum		0.7550
	Gold	0.6220	0.6715
	Silver	0.7185	0.6893
	Blue	0.5649	0.7490
\$80K - \$120K	Platinum		0.9265
	Gold	0.6540	0.7568
	Silver	0.6138	0.7299
	Blue	0.5735	0.7393
\$120K +	Platinum		0.6033
	Gold	0.6760	0.7409
	Silver	0.5989	0.7642
	Blue	0.5517	0.7118

Based on the heat map analysis, the biggest discrepancies from attrited and existing customers come from the following:

1. Total transaction amount
2. Total transaction count
3. Contacts count in past 12 months
4. Total revolving balance

Total relationship count

Attrition variables analysis - Heat map

Income..	Card Cate..	Attrition Flag	
		Attritted Customer	Existing Customer
Less than \$40K	Platinum	4,000	1,000
	Gold	4,000	3,200
	Silver	3,950	3,418
	Blue	3,447	3,923
\$40K - \$60K	Platinum	2,000	
	Gold	2,500	2,462
	Silver	3,091	3,443
	Blue	3,257	3,920
\$60K - \$80K	Platinum		2,000
	Gold	2,667	2,913
	Silver	2,455	3,682
	Blue	3,314	3,973
\$80K - \$120K	Platinum		2,000
	Gold	3,800	3,375
	Silver	2,727	3,558
	Blue	2,912	4,032
\$120K +	Platinum		2,500
	Gold	2,000	2,750
	Silver	3,455	3,469
	Blue	3,248	3,974

Total revolving balance

Attrition variables analysis - Heat map

Income..	Card Cate..	Attrition Flag	
		Attritted Customer	Existing Customer
Less than \$40K	Platinum	97	1,878
	Gold	819	1,222
	Silver	928	1,281
	Blue	679	1,238
\$40K - \$60K	Platinum	593	
	Gold	727	1,395
	Silver	115	1,237
	Blue	656	1,269
\$60K - \$80K	Platinum		1,659
	Gold	1,973	1,462
	Silver	376	1,165
	Blue	533	1,247
\$80K - \$120K	Platinum		1,627
	Gold	661	1,323
	Silver	734	1,308
	Blue	763	1,288
\$120K +	Platinum		1,726
	Gold	846	1,472
	Silver	663	1,586
	Blue	676	1,306

Total trans amt

Attrition variables analysis - Heat map

Income..	Card Cate..	Attrition Flag	
		Attritted Customer	Existing Customer
Less than \$40K	Platinum	4,851	11,976
	Gold	6,384	7,112
	Silver	5,215	7,484
	Blue	2,754	4,542
\$40K - \$60K	Platinum	4,758	
	Gold	6,838	11,452
	Silver	4,255	6,186
	Blue	2,902	4,501
\$60K - \$80K	Platinum		11,665
	Gold	5,950	8,117
	Silver	4,794	6,697
	Blue	3,053	4,381
\$80K - \$120K	Platinum		7,505
	Gold	5,304	5,815
	Silver	5,172	6,833
	Blue	3,558	4,423
\$120K +	Platinum		10,885
	Gold	8,412	9,131
	Silver	4,297	6,738
	Blue	3,216	4,409

Total trans count

Attrition variables analysis - Heat map

Income..	Card Cate..	Attrition Flag	
		Attritted Customer	Existing Customer
Less than \$40K	Platinum	58.50	109.50
	Gold	62.75	79.00
	Silver	55.15	81.43
	Blue	43.65	70.21
\$40K - \$60K	Platinum	65.00	
	Gold	62.50	100.92
	Silver	52.73	75.90
	Blue	44.05	67.89
\$60K - \$80K	Platinum		109.50
	Gold	61.33	84.78
	Silver	50.09	77.98
	Blue	42.92	64.65
\$80K - \$120K	Platinum		63.50
	Gold	58.00	77.81
	Silver	52.41	76.79
	Blue	46.72	64.48
\$120K +	Platinum		99.50
	Gold	68.50	94.56
	Silver	53.36	77.71
	Blue	44.50	65.49

Contacts count 12 months

Attrition variables analysis - Heat map

Income..	Card Cate..	Attrition Flag	
		Attritted Customer	Existing Customer
Less than \$40K	Platinum	3,500	2,000
	Gold	2,750	2,400
	Silver	3,100	2,309
	Blue	2,869	2,326
\$40K - \$60K	Platinum	4,000	
	Gold	2,000	2,462
	Silver	3,091	2,239
	Blue	3,105	2,353
\$60K - \$80K	Platinum		1,750
	Gold	3,167	2,217
	Silver	3,364	2,424
	Blue	2,971	2,372
\$80K - \$120K	Platinum		2,500
	Gold	3,200	2,375
	Silver	3,091	2,411
	Blue	2,944	2,395
\$120K +	Platinum		2,500
	Gold	3,500	2,188
	Silver	2,545	2,347
	Blue	2,991	2,466

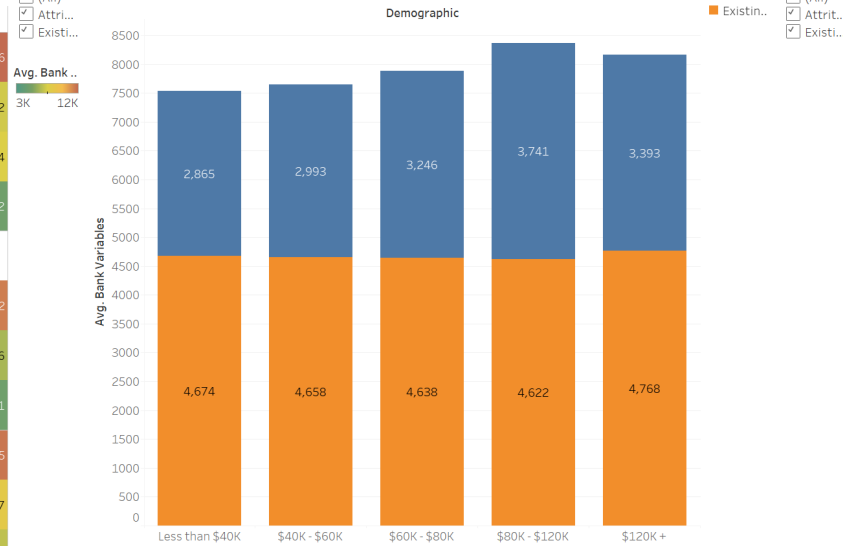
LET US TAKE A LOOK AT THEIR EFFECTS UP CLOSE

BANK – TOTAL TRANSACTION AMOUNT

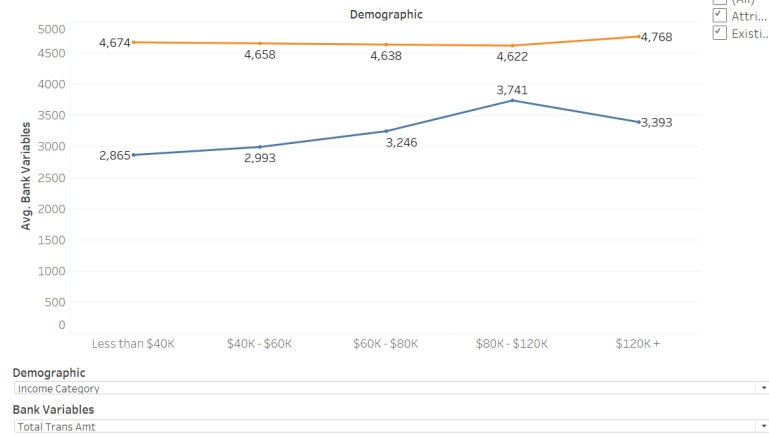
Attrition variables analysis - Heat map

Income...	Card Cate...	Attrited Customer	Attrition Flag	Existing Customer
Less than \$40K	Platinum		4,851	11,976
	Gold		6,384	7,112
	Silver		5,215	7,484
	Blue		2,754	4,542
\$40K - \$60K	Platinum		4,758	
	Gold		6,838	11,452
	Silver		4,255	6,186
	Blue		2,902	4,501
\$60K - \$80K	Platinum			11,665
	Gold		5,950	8,117
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	Blue		3,216	4,409

Attrition variables analysis - bar plot



Attrition variables analysis - line plot



From the heat map we can see **huge discrepancies** in the total transaction amount between **attrited** customers and **existing** customers

Attrited customers will have significantly **lower transaction amounts** across all card products

From previous demographic analysis, we know **income category** had a correlation to the attrition rate as well

Relating both **income category** and **total transaction amount** a trend was observed

As income decreases, total transaction amount also **decreases**, highlighting the underlying cause of higher attrition rates

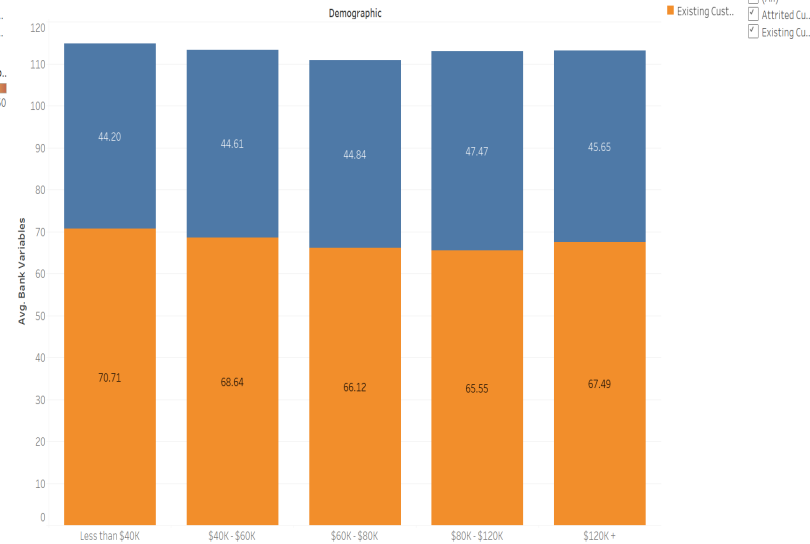
BASED ON TRANSACTION AMOUNT, ATTRITED CUSTOMERS HAVE LOWER TRANSACTION AMOUNTS THIS ALSO HAS A CORRELATION TO INCOME CATEGORY THEY BELONG TO

BANK – TOTAL TRANSACTION COUNT

Attrition variables analysis - Heat map



Attrition variables analysis - bar plot



Attrition variables analysis - line plot



Consequently from the low transaction amounts, **Attrited** customers will naturally have **lower transaction counts** across all card products as well

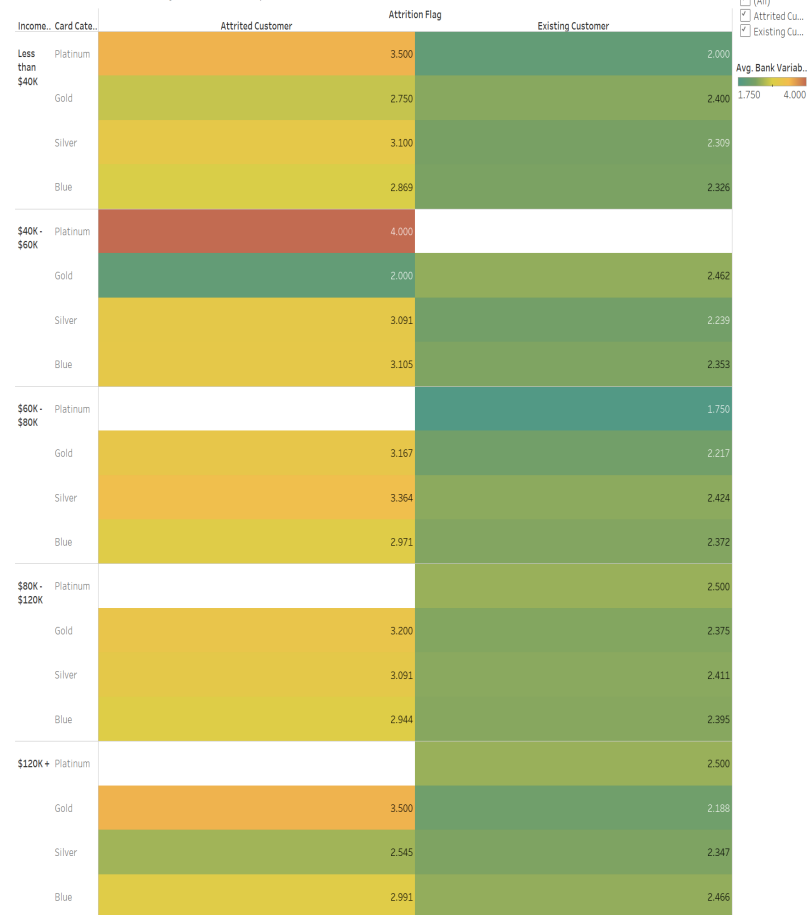
A trend however cannot be observed based of income category, indicating that the **transaction counts** may be **similar**, but based of different income levels, the **amounts transacted** are primarily the main difference

Screening through other demographic factors, they all seem to have **low correlation** as well

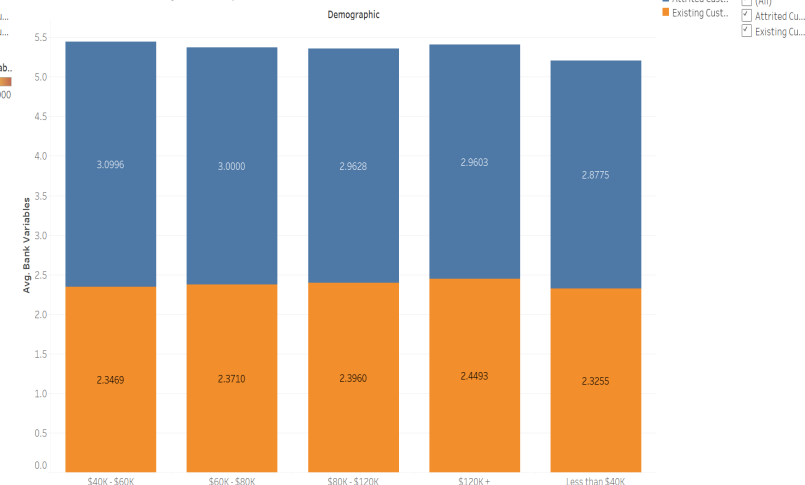
TRANSACTION AMOUNT AND COUNTS ARE HIGHLY CORRELATED HOWEVER, INCOME CATEGORY IS MORE CORRELATED TO THE TRANSACTION AMOUNT

BANK – CONTACT COUNTS IN PAST 12 MONTHS

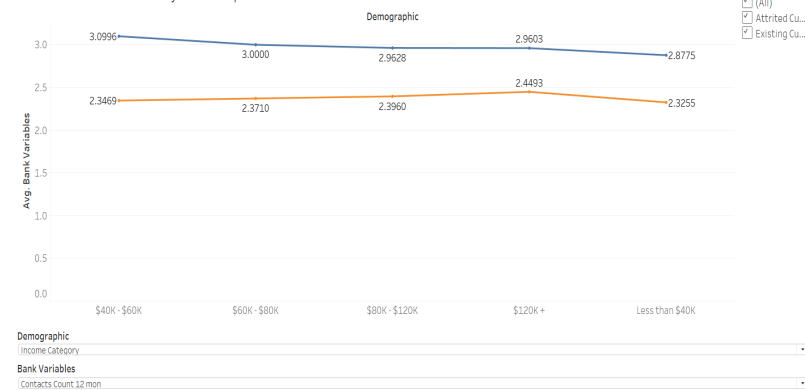
Attrition variables analysis - Heat map



Attrition variables analysis - bar plot



Attrition variables analysis - line plot



Based on the **contact counts** in the past 12 months, **attrited** customers across all products received **higher counts** of call from the bank

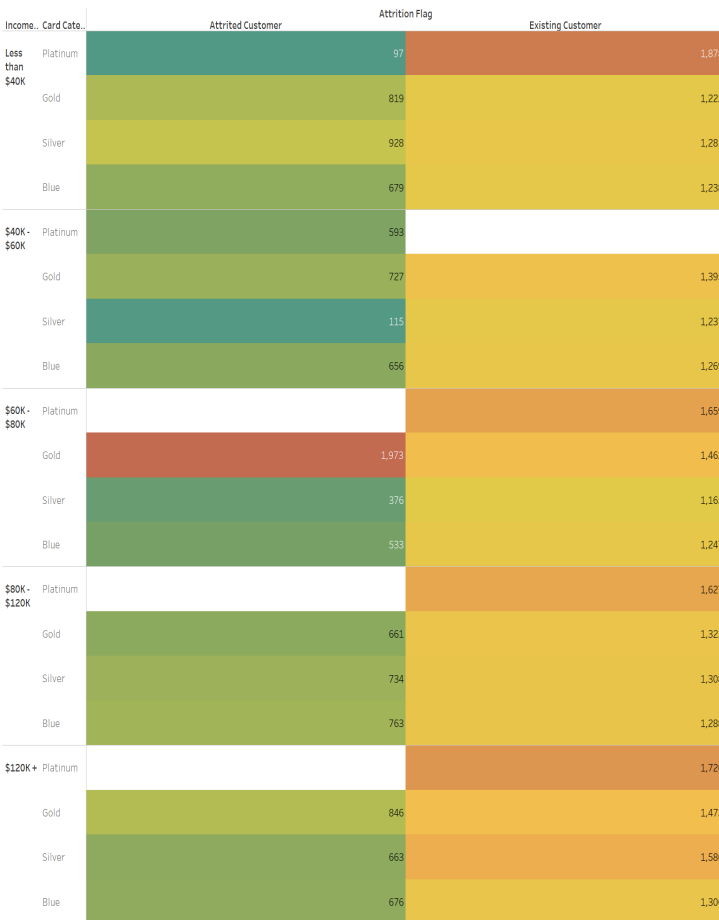
This raises the questions on the **effect** of calls on these customers and whether there is a need to **revise the marketing strategy** in promoting products to possibly **attriting** customers

Similarly a trend based on demographic factors are not observed, **eliminating the influence** on demographic on the effectiveness of the calls

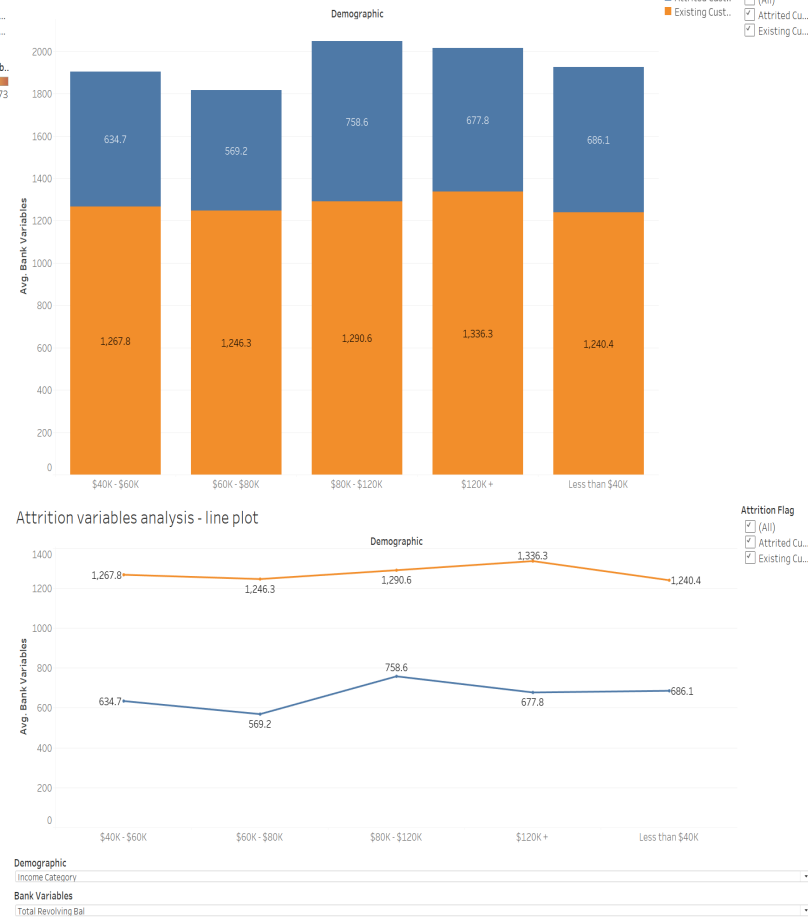
WITH AN INCREASE IN CONTACT COUNT, ATTRITING CUSTOMERS ALSO INCREASED. DEMOGRAPHIC INFLUENCE IS ELIMINATED

BANK – TOTAL REVOLVING BALANCE

Attrition variables analysis - Heat map



Attrition variables analysis - bar plot



Based on the **total revolving balance**, **attrited** customers across all products have substantially **lower** amounts.

The only **outlier** being the Gold card for the income category from \$60K - \$80K

Despite the outlier, the contacts to attriting customers was **still higher** than existing customers, indicating total revolving balance is **not the main trigger** for increased calls. Most likely the transaction amounts and calls.

Similarly a trend based on demographic factors are not observed, **eliminating the influence** on demographic on the total revolving balance.

WITH A DECREASE IN TOTAL REVOLVING BALANCE, ATTRITING CUSTOMERS ALSO INCREASED. DEMOGRAPHIC INFLUENCE ARE NOT A FACTOR IN THIS CASE.

REVISING THE THOUGHT PROCESS

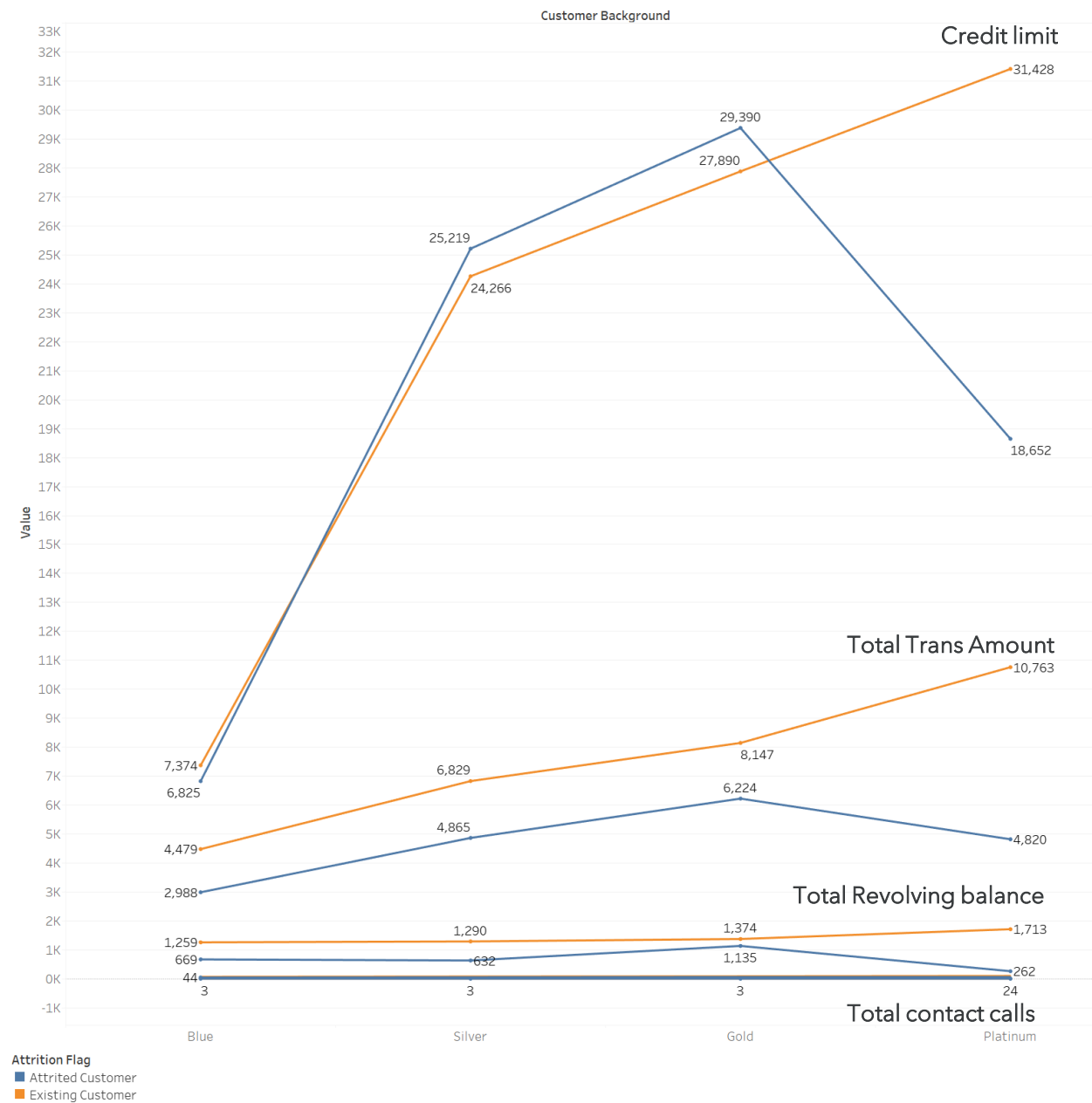
Observing the data so far, several bank metrics are identified that could give an idea on how attrited customers behaved

1. Main interaction by the bank are their **contact calls**
2. Customer behavior can be seen through their **transaction amount, count, revolving balance** and **credit limit**
3. Are the contacts **sufficient**? Are they doing enough to retain customers?
4. Can these metrics provide another outlook on the **reasons for attrition** and **strategize** on how to avoid them?

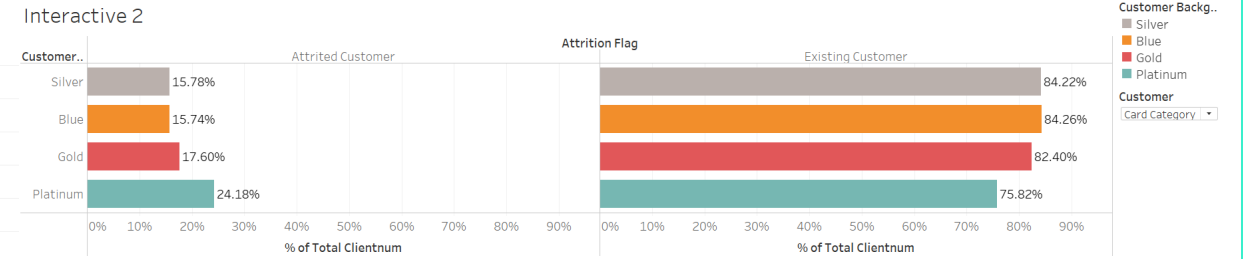


DIVING DEEPER INTO THE INTERACTIONS

Interactive 1

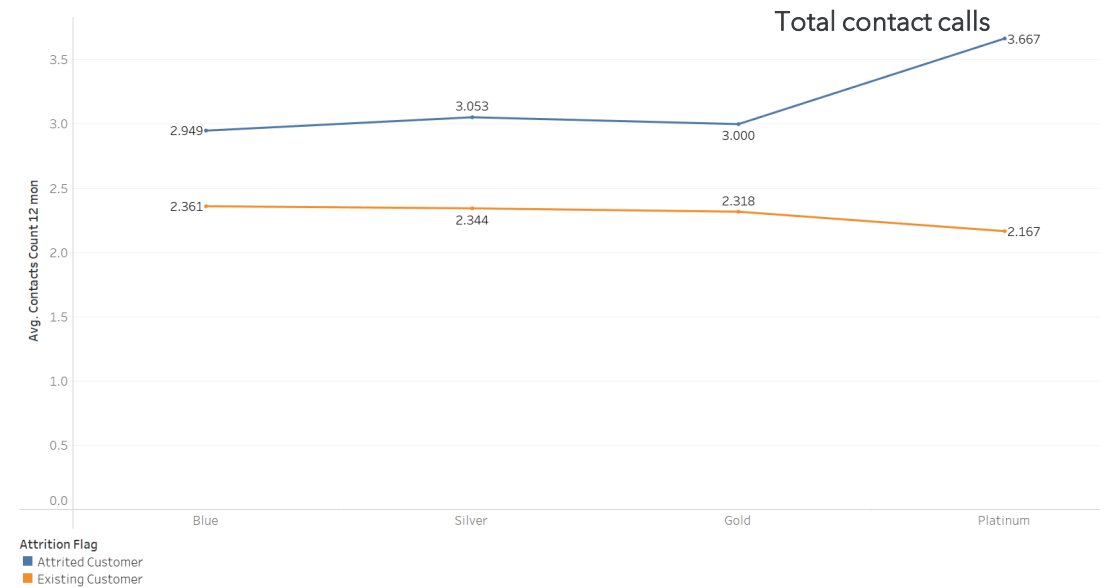


Interactive 2



It can be seen from the line plots that attriting customers for platinum holders **reduces their credit limit**

Their **transaction amount** also **decreases** significantly compared to existing customers



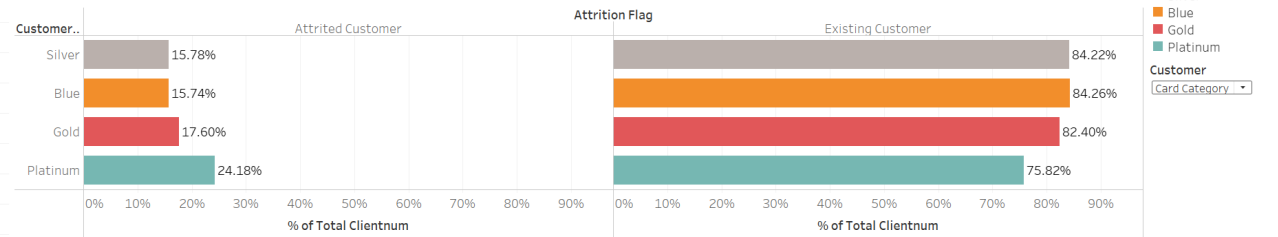
The contact calls increases with these metrics but despite that, the **attrition rate** is still **high** for platinum holders.

DIVING DEEPER INTO THE INTERACTIONS

Interactive 1

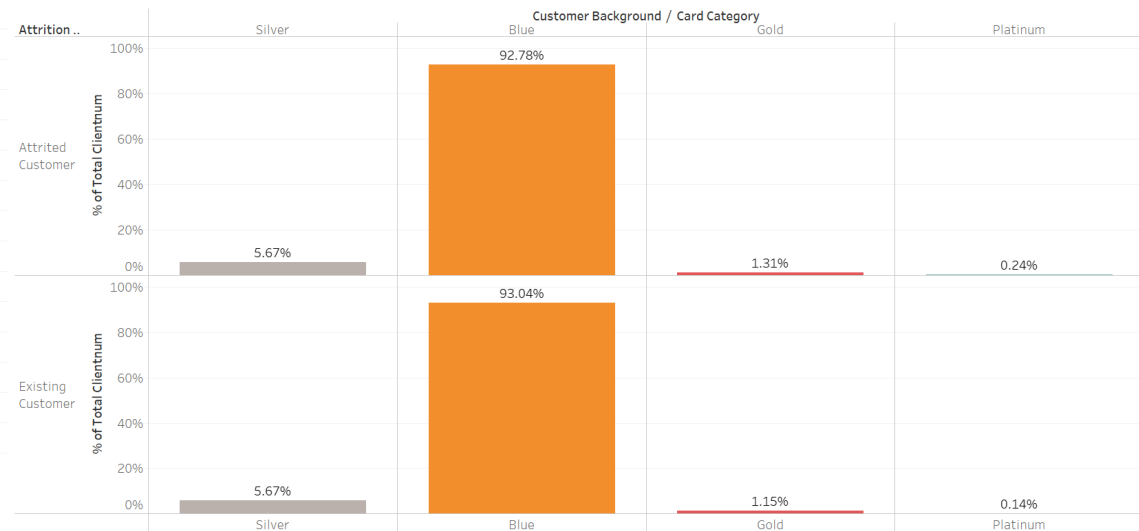


Interactive 2



Comparing between attrited and existing, **platinum** card holders have attrited the most

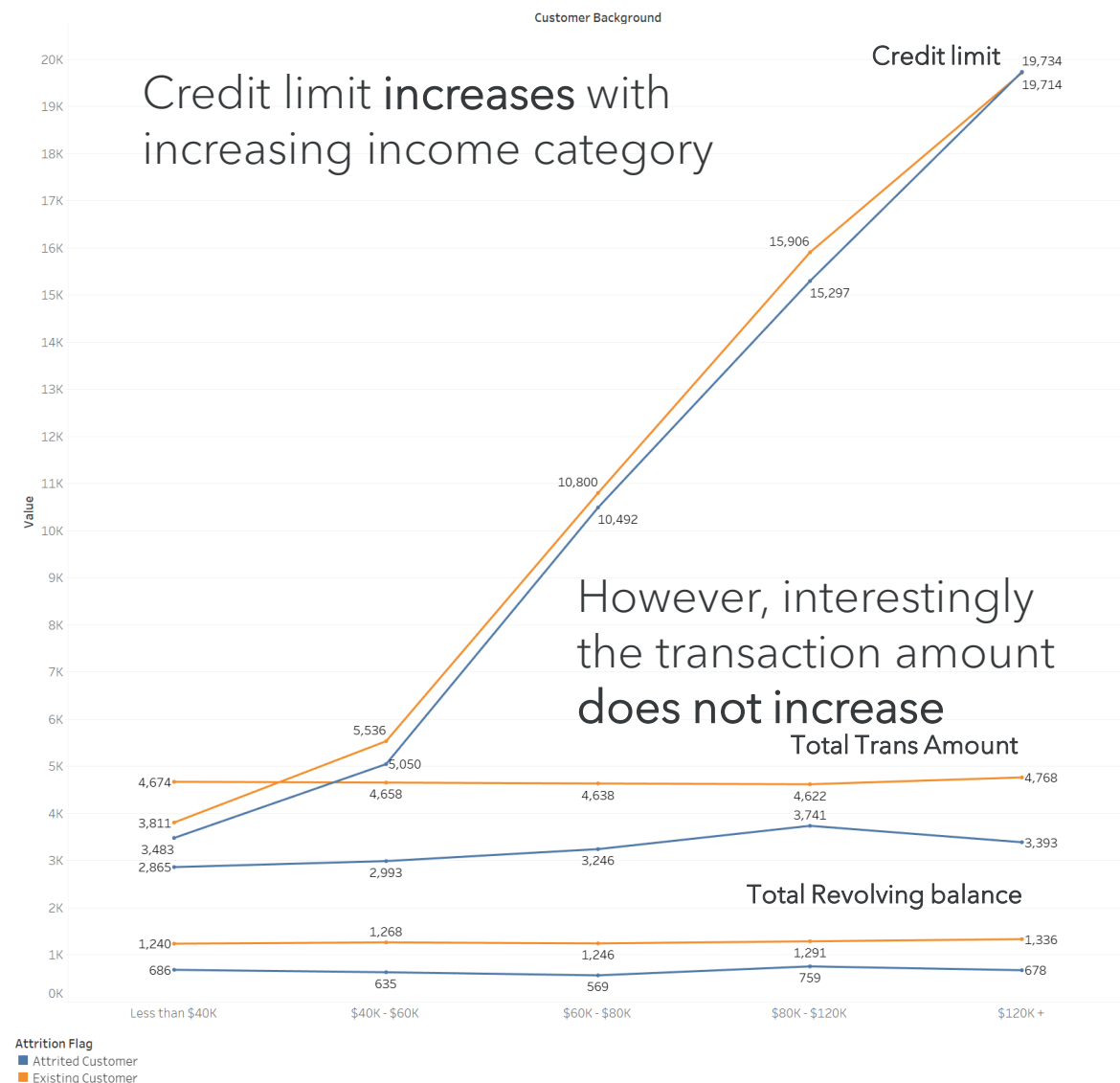
Interactive 3



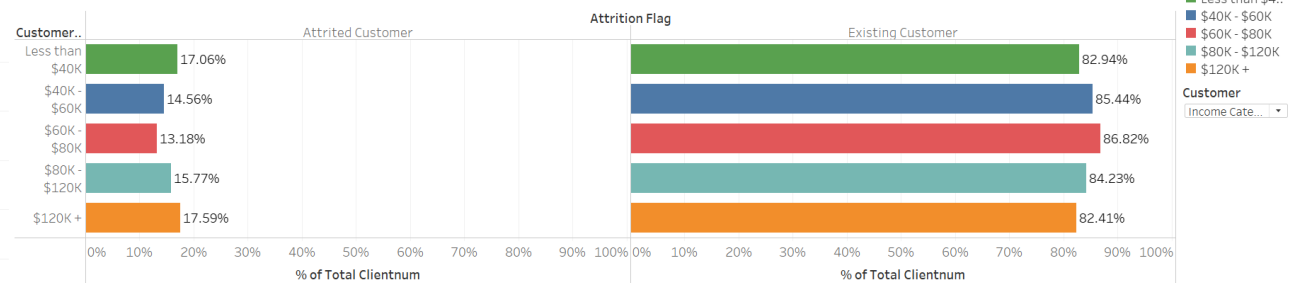
However across the board all the attrited customers, **blue** card holders has attrited the most among all the

DIVING DEEPER INTO THE INTERACTIONS

Interactive 1

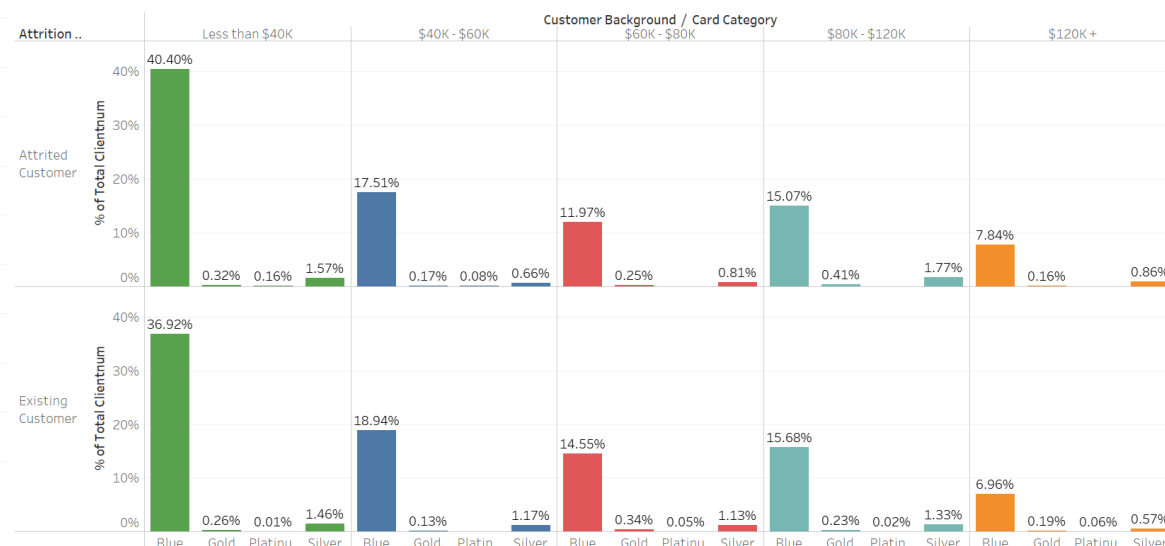


Interactive 2



Among the income categories, the lowest and highest brackets have the highest attrition rates. So despite the earning power of customers, customers are still choosing to attrite

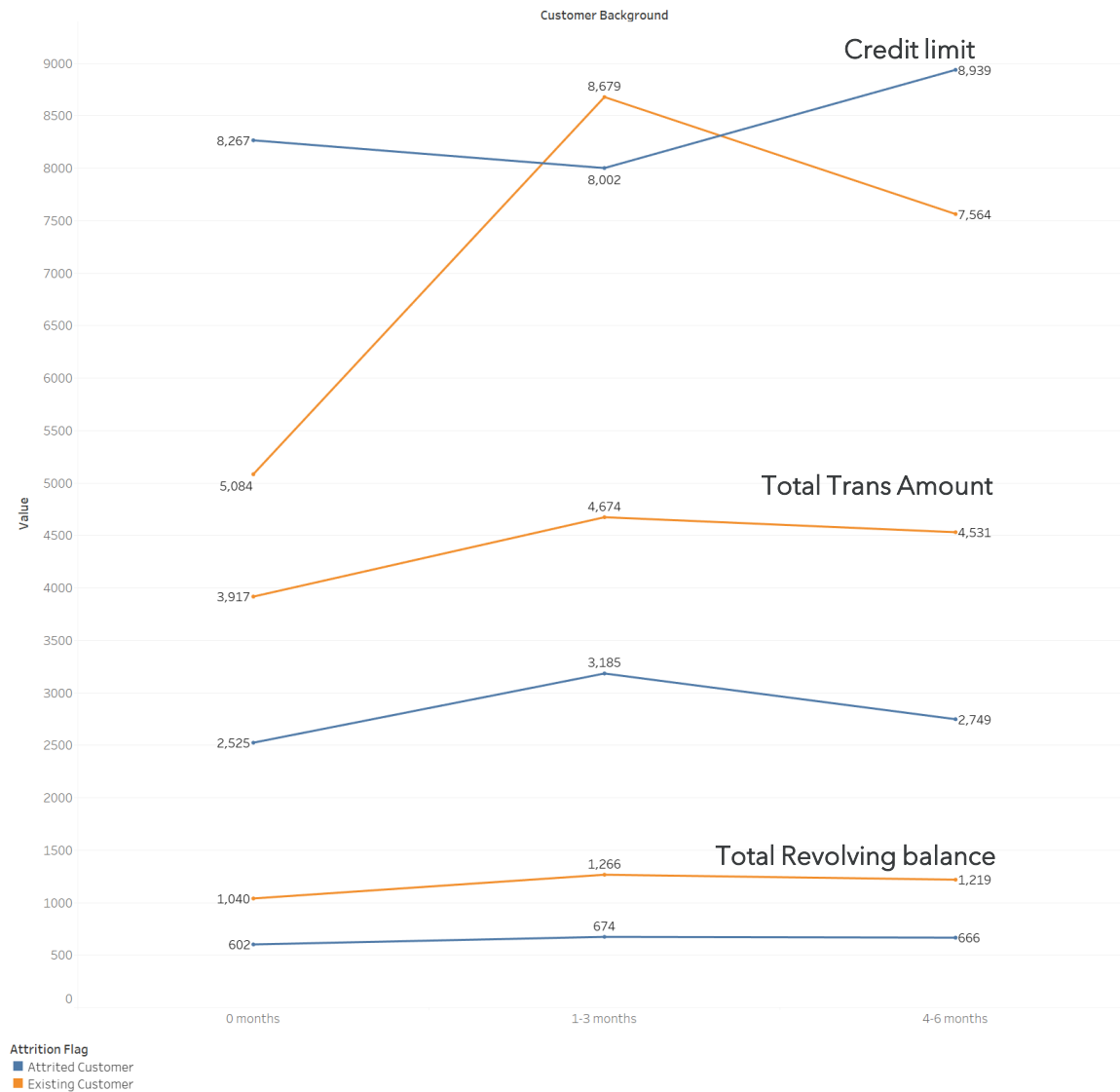
Interactive 3



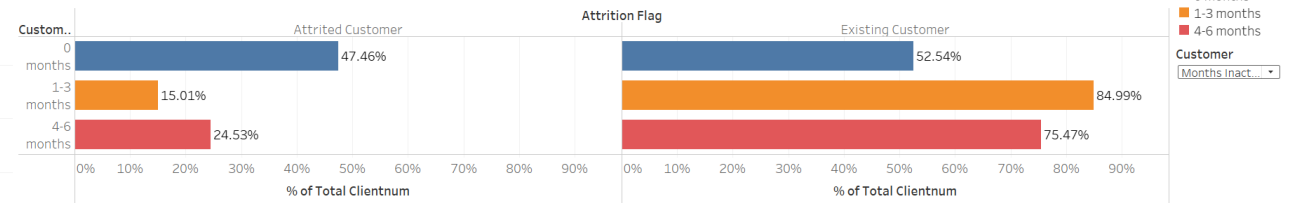
As suspected, the lower income bracket with the blue card has the highest attrition rate. Interestingly, this is also the same for all income brackets. Blue card may require more support

DIVING DEEPER INTO THE INTERACTIONS

Interactive 1

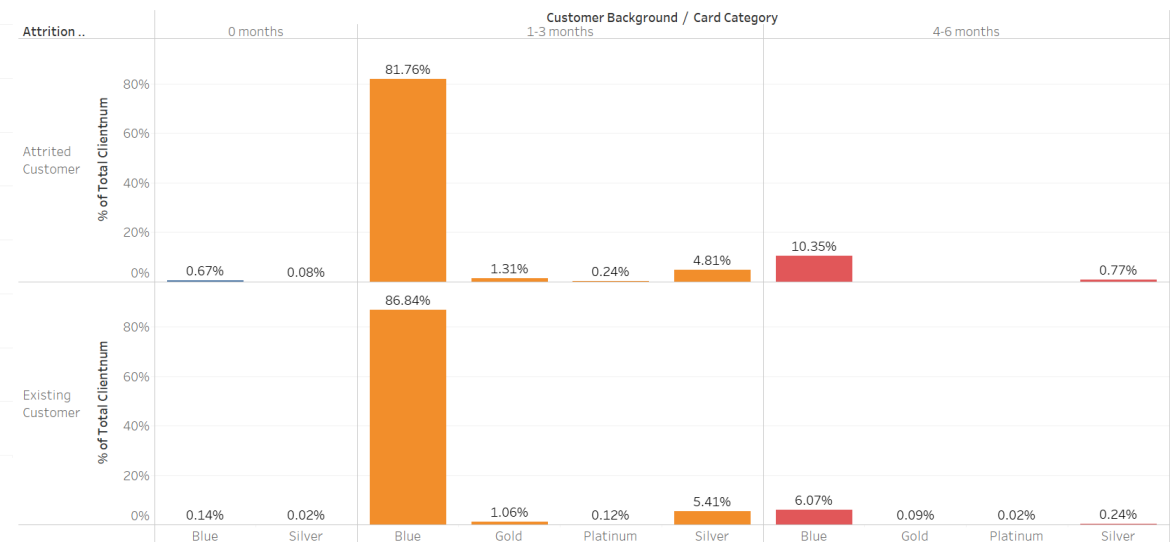


Interactive 2



Months inactive also provides an interesting insight where customers with **0 months of inactivity** has the highest attrition rate

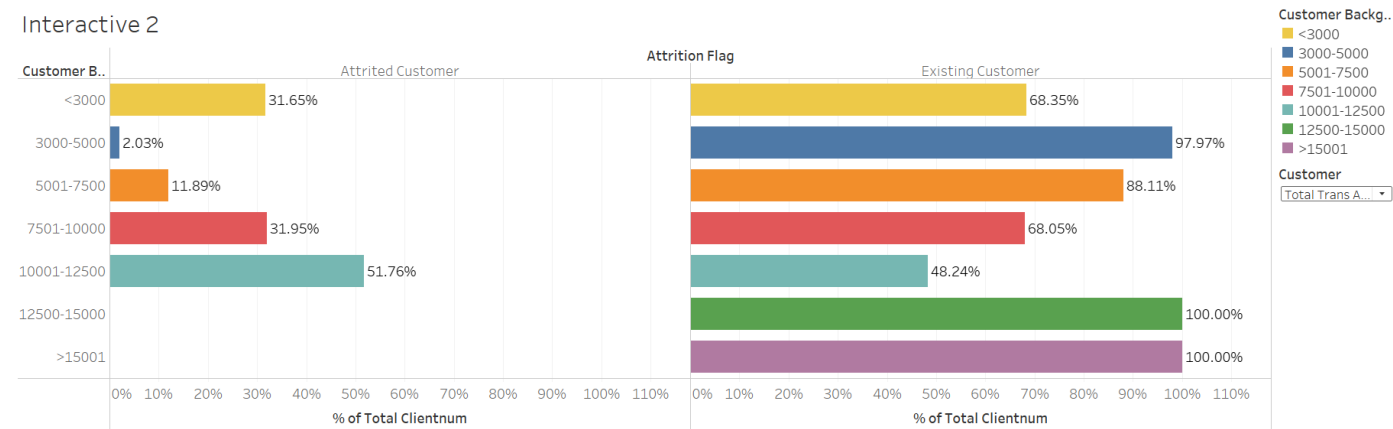
Interactive 3



But looking across the attritions, customers **inactive for 1-3 months** with the **blue** card product will have attrited the most. Highlighting another metric to identify potential attritions

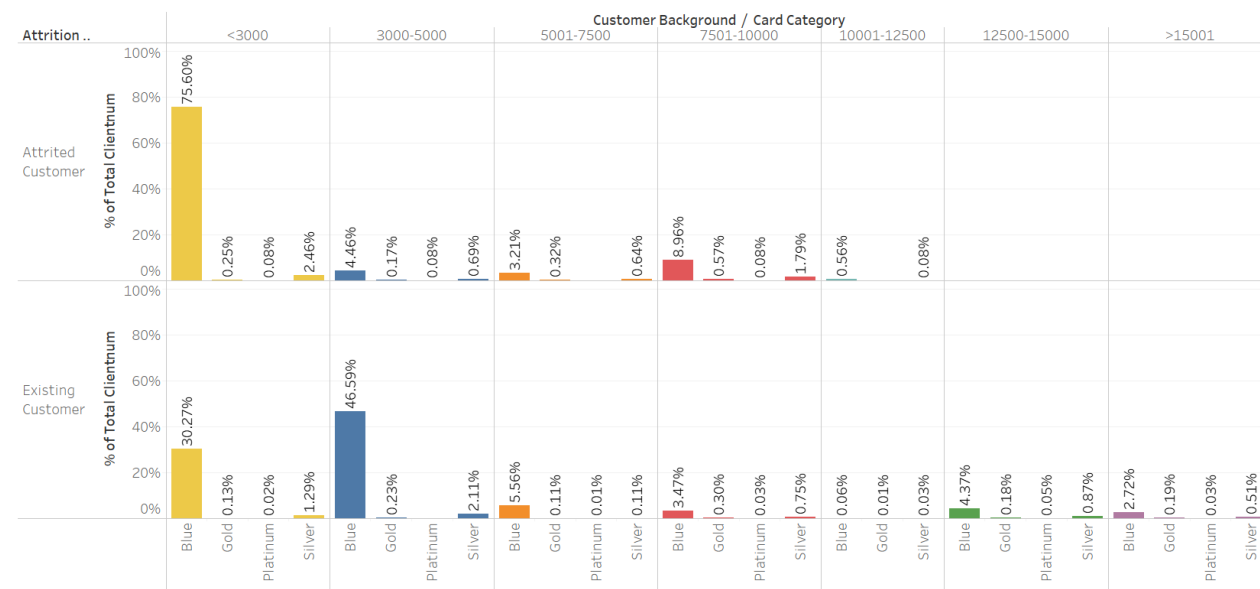
DIVING DEEPER INTO THE INTERACTIONS

Interactive 2



Total transaction amount provides another insight where customers using **\$10001 - \$12500** has the highest attrition rate when comparing between existing and attrited

Interactive 3



Across the board however, customers using **less than \$3000** shows the highest attrition rate overall.

Additionally, it is once again highlighted the weakness of the **blue** card.



SUMMARY OF RECOMMENDATIONS

INCOME CATEGORY

The income category that customers belongs to provided the most impact on whether they would attrite or not.

Both the **lowest** (less than \$40k) and **highest** (more than \$120k) showed the **highest attrition** rates

Among the attrited customers, the **lowest income bracket** had the highest attrition rate, indicating the priority group to target

An additional insight is despite the consequent **increase in the credit limit** based on the income bracket, customers are **not transacting** as much.

A look into promoting transaction rates can also help bring **more revenue** for the bank



MONTHS OF INACTIVITY

Customers with **0 months of inactivity** has the highest attrition rate

1-3 months being the highest comparing all those who have attrited

Thus, it is advised to target those who have been inactive for **less than 3 months**, contrary to the theoretical believe when longer inactivity leads to attrition.



BLUE CARD HOLDERS

Across all metrics, it is consistent that **blue** card holders have the highest attrition rates

Despite customer's **customer background**, months of **inactivity** and **transaction amount**

Highlights the needs behind the **promotion** and **reward system** in place for the blue card



TRANSACTION AMOUNT

Transaction amounts are a good way to track and predict attrition since the bank can easily access this data quickly

From the data, a significant amount of customers spending **less than \$3000** will attrite.

A look into the transaction benefits of cards needs to be looked at to **promote transactions** and thus **prevent attritions**.



CONTACT CALLS

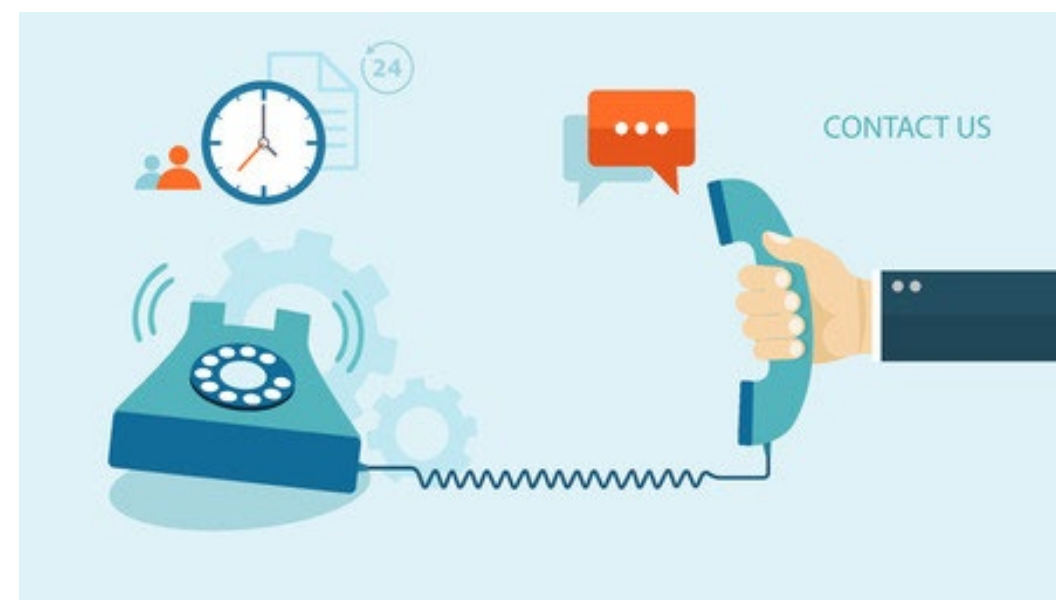
Attriting platinum card holders reduces their **credit limit**

Their **transaction amount** also significantly decreases

Additionally, we have established for **blue** card holders have the highest attrition rates.

Despite this, bank contact calls have **only** increased for platinum holders while blue card holders **remained the same** as other cards.

There is a need to revise how **effective** contact calls are and the priority in terms of tackling attritions



THANK YOU

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