US CREDIT CARD FRAUD REPORT

JUNE-DECEMBER 2020

DATASET SOURCE: CREDIT CARD TRANSACTIONS FRAUD DETECTION DATASET (KAGGLE.COM)

LILI_LOI_CAPSTONE PROJECT

GROWING LOSSES FROM CREDIT CARD FRAUD DURING THE COVID-19 PANDEMIC

Questions asked:

- What are the losses?

- What are the trends?

- Who are the high risk customers?

- How can we better protect our customers?

DATASET

The dataset is a simulated credit card transaction dataset containing legitimate and fraud transactions from the duration 1st Jan 2019 - 31st Dec 2020. It covers credit cards of 1000 customers doing transactions with a pool of 800 merchants.

Metadata includes:

○ Customer profile (Name, gender, DOB, Occupation)

○ Credit Card Numbers

○ Transaction date and time (Relevant only from June-Dec 2020)

○ Transaction Location

○ Merchants

○ Categories of Merchants

○ Type of Transactions (Aliases created from "Is Fraud")

CONCERNING PATTERNS

Fraudulent transactions make up a mere 0.38% of all transactions during this period. However, the fraudulent transaction amount is 2.88% (approximately US$1.1 mil) of total transaction amount, which translates to almost 7.5 times in proportion to the transaction number.
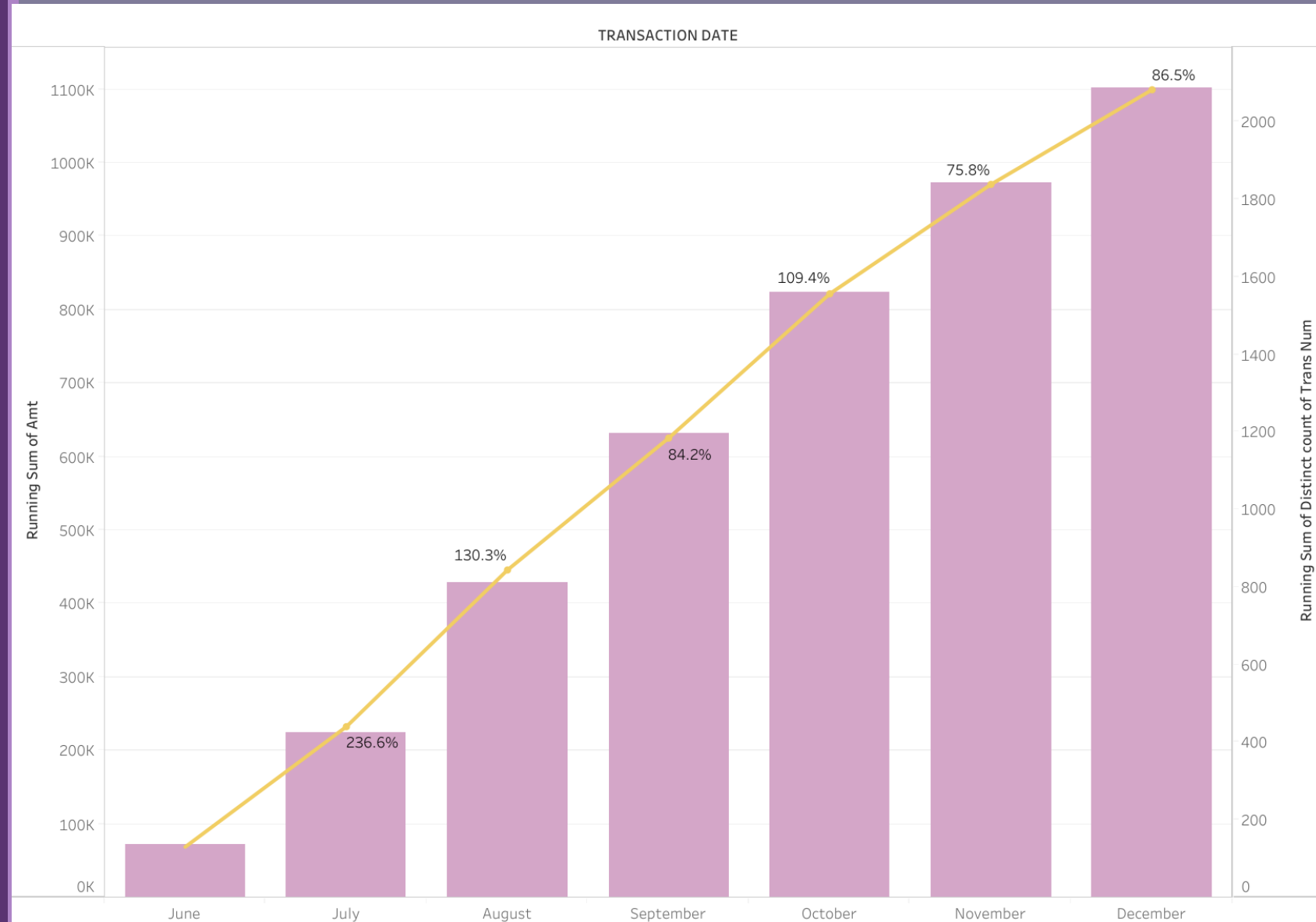
PERCENTAGE BY TRANSACTION TYPE
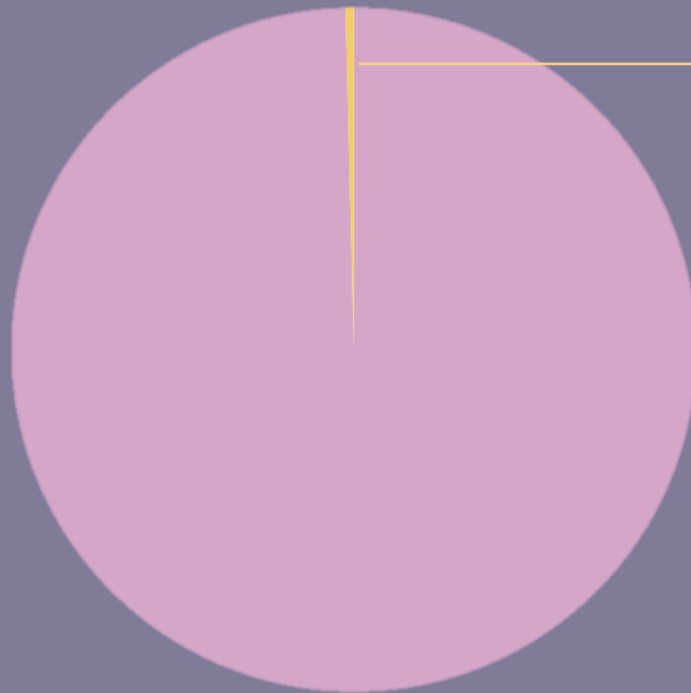
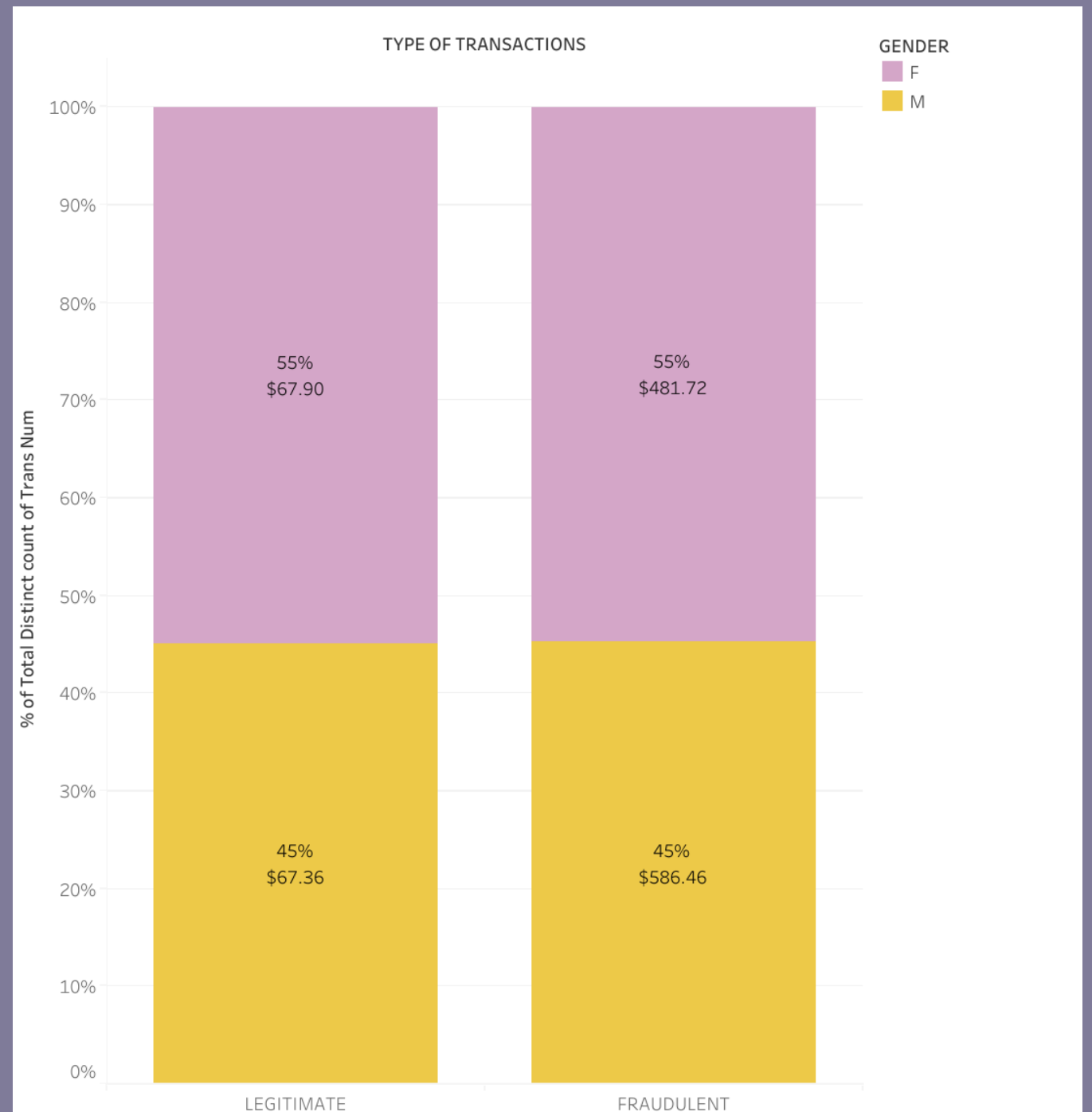PERCENTAGE BY TRANSACTION AMOUNT
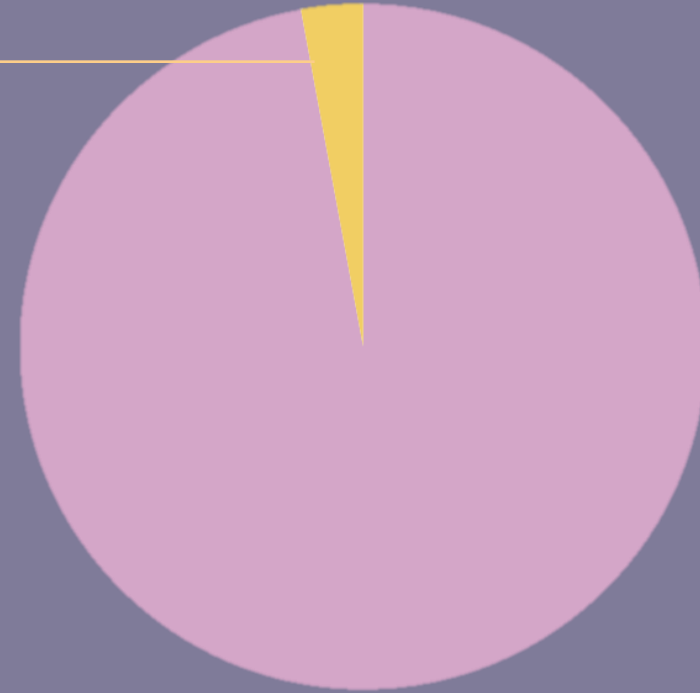
FRAUDULENT

PERIOD OF CONCERN

From June to December 2020, there were over US$1.1 mil. of fraudulent transactions. There is an exceptional growth in fraudulent transaction numbers during the period from August to October 2020. This coincides with the dip in COVID-19 cases in USA. A possibility may be the increase optimism that resulted in higher overall transactional volume, and as such, fraudulent transactions increased proportionately.

TRANSACTION DATE

https://public.tableau.com/views/LILI_LOI_CAPSTONEPROJECT/TIMELINE?:language=en-US&publish=yes&:display_count=n&:origin=viz_share_link

TRANSACTION GENDER DISTRIBUTION

55% of the transactions are made by female. This translates proportionately to the percentage of fraudulent transaction number. Though the average legitimate transaction amount for both gender is very similar, it is worrying to see that the average fraudulent transaction amount of male customers are significantly higher than female.

TYPE OF TRANSACTIONS

GENDER
F
M

% of Total Distinct count of Trans Num

100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%

55%
$67.90

55%
$481.72

45%
$67.36

45%
$586.46

LEGITIMATE

FRAUDULENT

CONCENTRATION OF FRAUDULENT TRANSACTIONS MADE IN THE EAST COAST

A significant proportion of the fraudulent transactions are made in the East Coast of USA, with states around New York in particular, having high transaction numbers and high value transactions.

The East Coast is one of the most populous and wealthy states in USA, with a higher proportion of credit card holders and higher credit limit. It is possible that they are targeted due to the high transaction volumes, where fraudulent transactions may be easily gone unnoticed by cardholders.
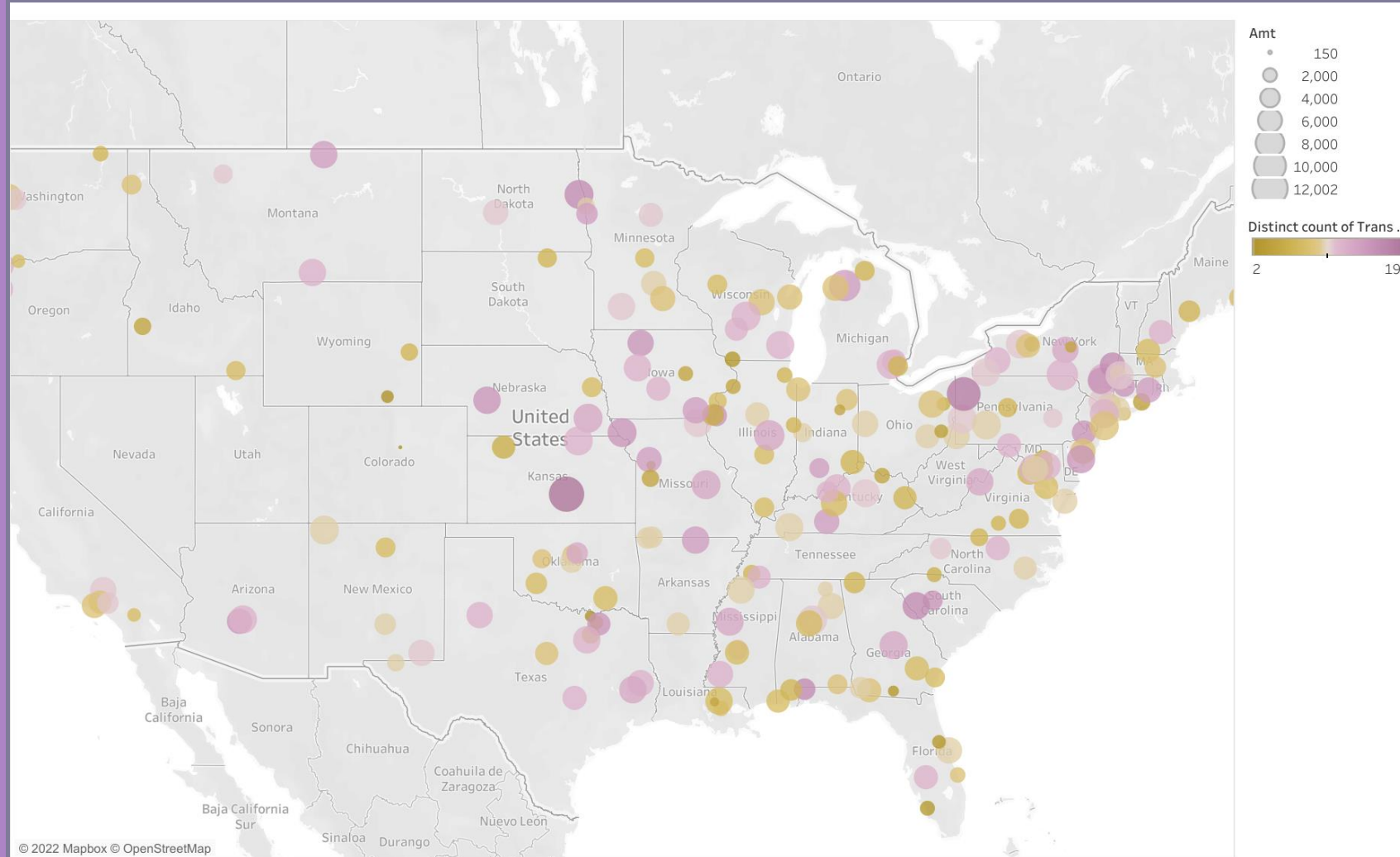
DIVING DEEPER

Male customers contribute to 5 out of 10 of the top 10 fraudulent transaction amount. It is significant to note that 70% of these large fraudulent transaction amount come from the E-commerce (Shopping) category, where there is relative ease of obtaining payment credentials from unsuspecting victims through phishing attacks.

70%
of the Top 10
Fraudulent amount are
over 60 years old,
and all transactions are from
E-COMMERCE (SHOPPING)

Trans Num	GENDER	CATEGORY	DOB (group)	
1352f5f821b77b49df4bc2329e5e249e	M	RETAIL (SHOPPING)	GENERATION Z 1996-2010	$1,320.92
3f039e6f6df9f883e39f3b7b6b782a9c	F	RETAIL (SHOPPING)	GENERATION X 1966-1980	$1,319.97
f652df33e5877d73c422fa8799db45b3	M	E-COMMERCE (SHOPPING)	BABY BOOMERS 1946-1960	$1,267.18
0eefd12b0610c181ed68a0391e09a0b0	F	RETAIL (SHOPPING)	GENERATION Z 1996-2010	$1,252.51
119f77ad81a44a478f374d4c4d467b7b	F	E-COMMERCE (SHOPPING)	SILENT GENERATION 1920-1945	$1,236.28
c19d9ff39ca763aea03afb594c10a1f8	F	E-COMMERCE (SHOPPING)	BABY BOOMERS 1946-1960	$1,203.92
e65981c43c21dc4dbfb70891593d0bf9	M	E-COMMERCE (SHOPPING)	BABY BOOMERS 1946-1960	$1,198.12
041e573c99f5f86a5110a99a2227d976	M	E-COMMERCE (SHOPPING)	BABY BOOMERS 1946-1960	$1,197.26
7f5f052da88a47670cbb3566078e10bd	F	E-COMMERCE (SHOPPING)	SILENT GENERATION 1920-1945	$1,187.73
c0965ce6c7362c6dd359347a06371a9b	M	E-COMMERCE (SHOPPING)	SILENT GENERATION 1920-1945	$1,186.21

DOB (group)
- BABY BOOMERS 1946-1960
- GENERATION X 1966-1980
- GENERATION Z 1996-2010
- SILENT GENERATION 1920-1945

Distinct count of Trans Num broken down by Gender, Cc Num, Dob Year and Amt. The view is filtered on Amt, which keeps 10 of 60,939 members.
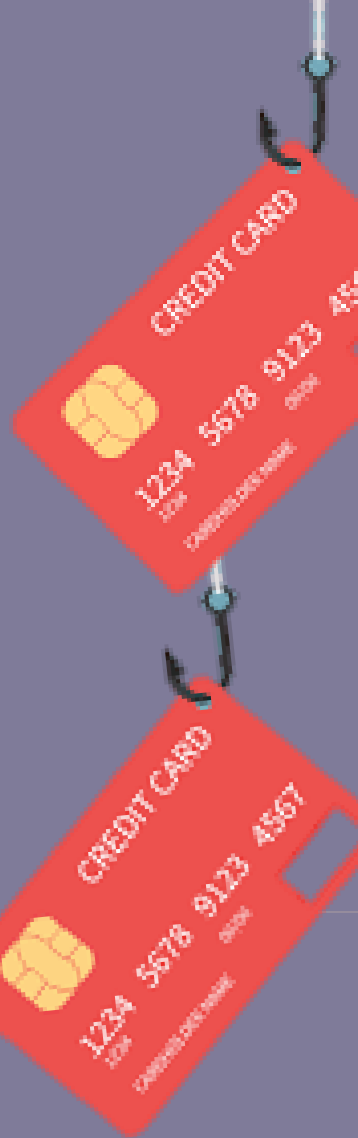
TRANSACTION DATE

2020

Category (group)	September	August	December	June	November	July	October	Grand Total
E-COMMERCE (SHOPPING)	$934.94	$921.00	$922.28	$935.97	$926.05	$936.12	$927.60	$928.93
RETAIL (SHOPPING)	$756.54	$765.41	$795.13	$656.62	$658.84	$658.41	$562.84	$702.80
ENTERTAINMENT	$479.56	$510.34	$495.69	$536.46	$486.03	$545.03	$530.37	$509.77
GROCERY OUTLET	$311.44	$317.16	$318.57	$315.66	$309.97	$313.75	$310.96	$313.59
HOME	$293.53	$264.47	$233.21	$272.45	$278.83	$247.64	$269.17	$257.73
DINING	$120.27	$123.69	$121.29	$115.67	$119.03	$123.97	$123.24	$122.46
PERSONAL CARE	$19.83	$26.72	$25.37	$28.27	$33.71	$20.09	$27.18	$25.92
KIDS & PETS	$20.15	$20.62	$19.85	$19.69	$19.93	$19.30	$20.24	$20.09
HEALTH & FITNESS	$19.64	$20.49	$19.07	$21.51	$18.44	$19.16	$20.83	$20.20
GAS STATION	$11.47	$13.29	$11.85	$11.84	$11.67	$11.19	$12.94	$12.03
E-COMMERCE (GROCERY)	$11.59	$10.08	$7.76	$13.25	$11.49	$11.84	$13.28	$11.69
TRAVEL	$8.67	$10.12	$8.70	$7.83	$8.41	$8.88	$7.68	$8.70
Grand Total	$596.18	$507.14	$530.73	$552.73	$528.35	$491.13	$514.95	$529.19

Avg. Amt

$7.68 — $936.12

FRAUDULENT TRANSACTIONS

1 E-COMMERCE (SHOPPING)
2 RETAIL (SHOPPING)
3 GROCERY OUTLET

LEGITIMATE TRANSACTIONS

1 RETAIL (SHOPPING)
2 GAS STATION
3 GROCERY OUTLET

CATEGORY	FRAUDULENT	LEGITIMATE
E-COMMERCE (SHOPPING)	23.72%	7.45%
GROCERY OUTLET	22.37%	9.40%
RETAIL (SHOPPING)	25.83%	20.11%
GAS STATION	7.25%	10.13%
TRAVEL	1.92%	3.14%
E-COMMERCE (GROCERY)	1.82%	3.52%
PERSONAL CARE	3.36%	7.09%
ENTERTAINMENT	2.83%	7.23%
DINING	2.54%	7.09%
KIDS & PETS	3.02%	8.78%
HEALTH & FITNESS	2.26%	6.61%
HOME	3.07%	9.44%

Avg. Amt

8.7   994.7

POSSIBLE CAUSES

- Rise in E-commerce due to the Covid-19 pandemic has led to increase breaches through phising, malware and unsecured payment gateway.

- Grocery stores experience high traffic and transactions. The risk of card numbers and PIN being captured illegally is high.

- Covid numbers came down between July to September 2020, resulting in relaxation in restrictions. The increase in fraudulent transaction in Retail Shopping is reflective in the bounce back of Retail sales.

SUGGESTED MITIGATIONS

ENCOURAGE MERCHANTS TO ADOPT SECURED PAYMENT METHODS

ADOPT EMAIL OR TEXT MESSAGE ALERTS FOR TRANSACTION AMOUNT ABOVE THE AVERAGE SPENDING

RAISE AWARENESS ON PHISHING, WITH A SPECIAL OUTREACH TO CUSTOMERS ABOVE 60 YEARS OLD, WHO MAY NOT BE AS INTERNET SAVVY

REMIND CUSTOMERS NOT TO REVEAL PERSONAL INFORMATION AND CREDIT CARD DETAILS TO UNVERIFIED SOURCES

MONITOR UNUSUAL LARGE TRANSACTIONS IN E-COMMERCE FOR CUSTOMERS WHO ARE ABOVE 65 YEARS OLD

THANK YOU.