

```
In [ ]: # Goal :- The goal is to provide the insights into the transactions trends , dev
# unconver deeper insights.
```

```
In [1]: import pandas as pd
import numpy as np
file_path = "C:/Users/anush/Downloads/phonepephone_pay_case_study.xlsx"
state_txn_users = pd.read_excel(file_path, sheet_name="State_Txn and Users")
state_txn_split = pd.read_excel(file_path, sheet_name="State_TxnSplit")
state_device_data = pd.read_excel(file_path, sheet_name="State_DeviceData")
district_txn_users = pd.read_excel(file_path, sheet_name="District_Txn and Users")
district_demo = pd.read_excel(file_path, sheet_name="District Demographics")
```

```
In [3]: state_txn_users.shape
```

```
Out[3]: (504, 8)
```

```
In [ ]: import pandas as pd
import numpy as np
file_path = "C:/Users/anush/Downloads/Interview Dataset.xlsx"
df = pd.read_excel(file_path)
```

Understanding the Data

```
In [2]: # 1. Load the State_Txn and Users dataset and display its first 5 rows.
state_txn_users.head()
```

```
Out[2]:
```

	State	Year	Quarter	Transactions	Amount (INR)	ATV (INR)	Registered Users	Ap Open
0	Andaman & Nicobar Islands	2018	1	6658	1.463176e+07	2197.621091	6740	
1	Andaman & Nicobar Islands	2018	2	11340	2.833854e+07	2498.989022	9405	
2	Andaman & Nicobar Islands	2018	3	16265	5.555747e+07	3415.768284	12149	
3	Andaman & Nicobar Islands	2018	4	23758	9.054834e+07	3811.277720	15222	
4	Andaman & Nicobar Islands	2019	1	30486	1.022997e+08	3355.630147	18596	

```
In [3]: # 2. Load the State_TxnSplit dataset and display its bottom 10 rows.
```

```
state_txn_split.tail(10)
```

Out[3]:

	State	Year	Quarter	Transaction Type	Transactions	Amount (INR)	ATV (INR)
2504	West Bengal	2021	1	Peer-to-peer payments	53869075	2.022402e+11	3754.292226
2505	West Bengal	2021	1	Merchant payments	37143701	2.891834e+10	778.553104
2506	West Bengal	2021	1	Recharge & bill payments	26673733	1.133967e+10	425.124820
2507	West Bengal	2021	1	Financial Services	166727	1.754458e+08	1052.293941
2508	West Bengal	2021	1	Others	400816	2.635025e+08	657.415236
2509	West Bengal	2021	2	Peer-to-peer payments	64661051	2.308123e+11	3569.572026
2510	West Bengal	2021	2	Merchant payments	41696787	3.478787e+10	834.305703
2511	West Bengal	2021	2	Recharge & bill payments	34799709	1.333145e+10	383.090958
2512	West Bengal	2021	2	Financial Services	190537	1.864665e+08	978.636630
2513	West Bengal	2021	2	Others	549353	3.167447e+08	576.577748

In [4]: *# 3. Load the State_DeviceData dataset and display 10 rows from the middle of the dataset*

```
mid = len(state_device_data)//2
state_device_data.iloc[mid-5:mid+5]
```

Out[4]:

	State	Year	Quarter	Brand	Registered Users	Percentage
2767	Ladakh	2021	2	OnePlus	1741	0.023198
2768	Ladakh	2021	2	Motorola	922	0.012285
2769	Ladakh	2021	2	Huawei	894	0.011912
2770	Ladakh	2021	2	Lenovo	490	0.006529
2771	Ladakh	2021	2	Others	2610	0.034778
2772	Lakshadweep	2018	1	Samsung	102	0.203593
2773	Lakshadweep	2018	1	Xiaomi	100	0.199601
2774	Lakshadweep	2018	1	Vivo	67	0.133733
2775	Lakshadweep	2018	1	Oppo	56	0.111776
2776	Lakshadweep	2018	1	Huawei	25	0.049900

In [5]: *# 4. Load the District_Txn and Users dataset and display its first 10 rows and last 10 rows*
`district_txn_users.head(10)`
`district_txn_users.tail(10)`

Out[5]:

	State	Year	Quarter	District	Code	Transactions	Amount (INR)	ATV (INR)
10238	West Bengal	2021	2	Murshidabad	WB14	8602251	1.999694e+10	2324.61
10239	West Bengal	2021	2	Nadia	WB15	5524174	1.122758e+10	2032.44
10240	West Bengal	2021	2	North Twenty Four Parganas	WB16	17258291	3.041482e+10	1762.33
10241	West Bengal	2021	2	Paschim Bardhaman	WB17	4893774	8.731263e+09	1784.15
10242	West Bengal	2021	2	Paschim Medinipur	WB18	5051834	1.030351e+10	2039.55
10243	West Bengal	2021	2	Purba Bardhaman	WB19	3920729	7.572502e+09	1931.40
10244	West Bengal	2021	2	Purba Medinipur	WB20	6418522	1.515507e+10	2361.14
10245	West Bengal	2021	2	Purulia	WB21	1895981	2.790996e+09	1472.05
10246	West Bengal	2021	2	South Twenty Four Parganas	WB22	6661813	1.339853e+10	2011.24
10247	West Bengal	2021	2	Uttar Dinajpur	WB23	2253385	5.564221e+09	2469.27

In [6]: *# 5. Load the District Demographics dataset and display every 10th row*
`district_demo.iloc[::10]`

Out[6]:

	State	District	Headquarters	Population	Area (sq km)	Density	Code	
0	Andhra Pradesh	Anantapur	Anantapur	4083315	19130.0	213	AP01	
10	Andhra Pradesh	Visakhapatnam	Visakhapatnam	4288113	11161.0	384	AP10	Vis
20	Arunachal Pradesh	Lepa Rada	Basar	0	0.0	0	AR08	
30	Arunachal Pradesh	Siang	Pangin	31920	2919.0	11	AR18	
40	Assam	Barpeta	Barpeta	1693622	3245.0	520	AS03	
...
700	Chandigarh	Chandigarh	Chandigarh	1055450	114.0	9258	CH01	
710	Jammu & Kashmir	Jammu	Jammu	1526406	3097.0	596	JK07	
720	Jammu & Kashmir	Samba	Samba	318611	913.0	318	JK17	
730	Delhi	North Delhi	Sadar Bazaar	887978	59.0	14557	DL04	
740	Puducherry	Puducherry	Pondicherry	950289	293.0	3232	PY03	

75 rows × 8 columns



Display basic statistics and data types for each dataset

In [2]: `state_txn_users.describe()`

Out[2]:

	Year	Quarter	Transactions	Amount (INR)	ATV (INR)	Registered Users
count	504.000000	504.000000	5.040000e+02	5.030000e+02	504.000000	5.040000e+02
mean	2019.285714	2.357143	4.074000e+07	7.083332e+10	1993.471543	4.777501e+06
std	1.031181	1.109971	8.228714e+07	1.440902e+11	607.464894	6.644496e+06
min	2018.000000	1.000000	7.780000e+02	1.928611e+06	0.000000	5.010000e+02
25%	2018.000000	1.000000	5.925578e+05	1.167157e+09	1598.910667	1.574202e+05
50%	2019.000000	2.000000	6.217487e+06	1.051605e+10	1861.380589	1.747914e+06
75%	2020.000000	3.000000	4.363675e+07	6.947045e+10	2259.087924	7.320945e+06
max	2021.000000	4.000000	5.736165e+08	1.027958e+12	3938.733850	3.966470e+07



In [9]: state_txn_split.describe()

Out[9]:

	Year	Quarter	Transactions	Amount (INR)	ATV (INR)
count	2514.000000	2514.000000	2.514000e+03	2.514000e+03	2514.000000
mean	2019.286794	2.358393	8.167446e+06	1.443978e+10	1349.927929
std	1.030807	1.109251	2.423645e+07	5.995054e+10	1534.866221
min	2018.000000	1.000000	2.000000e+00	3.439721e+01	17.198606
25%	2018.000000	1.000000	2.788075e+04	1.762412e+07	385.735827
50%	2019.000000	2.000000	2.687980e+05	1.901189e+08	720.940406
75%	2020.000000	3.000000	3.683230e+06	2.661248e+09	1352.790116
max	2021.000000	4.000000	2.795990e+08	8.721520e+11	7767.539936

In [10]: state_device_data.describe()


Out[10]:

	Year	Quarter	Registered Users	Percentage
count	5544.000000	5544.000000	5.544000e+03	5544.000000
mean	2019.285714	2.357143	4.343183e+05	0.090909
std	1.030250	1.108970	9.056069e+05	0.083095
min	2018.000000	1.000000	1.000000e+01	0.006373
25%	2018.000000	1.000000	8.055750e+03	0.021588
50%	2019.000000	2.000000	7.442250e+04	0.056914
75%	2020.000000	3.000000	3.978875e+05	0.143626
max	2021.000000	4.000000	9.764252e+06	0.478367

In [11]: district_txn_users.describe()

Out[11]:

	Year	Quarter	Transactions	Amount (INR)	ATV (INR)	Registered Users
count	10248.000000	10248.000000	1.024800e+04	1.024800e+04	10244.000000	1.024800e+04
mean	2019.285714	2.357143	2.003607e+06	3.542311e+09	1909.796545	2.349591e+06
std	1.030208	1.108924	9.613466e+06	1.473154e+10	600.943349	4.605978e+06
min	2018.000000	1.000000	0.000000e+00	0.000000e+00	84.944283	2.200000e+06
25%	2018.000000	1.000000	1.031418e+05	1.756668e+08	1554.589051	3.619550e+06
50%	2019.000000	2.000000	3.763065e+05	6.784562e+08	1863.135530	1.067640e+07
75%	2020.000000	3.000000	1.272815e+06	2.377256e+09	2203.083552	2.573165e+07
max	2021.000000	4.000000	3.487128e+08	4.444224e+11	11209.980550	1.060461e+08



In [12]: district_demo.describe()

Out[12]:

	Population	Area (sq km)	Density
count	7.420000e+02	742.000000	742.000000
mean	1.668555e+06	4395.373120	838.512129
std	1.458849e+06	4254.676124	2754.406896
min	0.000000e+00	0.000000	0.000000
25%	6.530815e+05	2039.750000	198.000000
50%	1.322359e+06	3402.500000	353.000000
75%	2.297440e+06	5432.750000	686.250000
max	1.008285e+07	45652.000000	36155.000000

In [13]: state_txn_users.dtypes

Out[13]:

State	object
Year	int64
Quarter	int64
Transactions	int64
Amount (INR)	float64
ATV (INR)	float64
Registered Users	int64
App Opens	int64
dtype:	object

In [14]: state_txn_split.dtypes

```
Out[14]: State          object
        Year           int64
        Quarter        int64
        Transaction Type object
        Transactions    int64
        Amount (INR)    float64
        ATV (INR)       float64
        dtype: object
```

```
In [15]: state_device_data.dtypes
```

```
Out[15]: State          object
        Year           int64
        Quarter        int64
        Brand           object
        Registered Users int64
        Percentage      float64
        dtype: object
```

```
In [16]: district_txn_users.dtypes
```

```
Out[16]: State          object
        Year           int64
        Quarter        int64
        District        object
        Code            object
        Transactions    int64
        Amount (INR)    float64
        ATV (INR)       float64
        Registered Users int64
        App Opens       int64
        dtype: object
```

```
In [17]: district_demo.dtypes
```

```
Out[17]: State          object
        District        object
        Headquarters    object
        Population       int64
        Area (sq km)     float64
        Density          int64
        Code            object
        Alternate Name   object
        dtype: object
```

Check for missing values

```
In [18]: # Identify any missing values in each dataset..
        state_txn_users.isnull().sum()
```

```
Out[18]: State          0
        Year           0
        Quarter        0
        Transactions    0
        Amount (INR)    1
        ATV (INR)       0
        Registered Users 0
        App Opens       0
        dtype: int64
```

```
In [19]: state_txn_users.dropna(inplace = True)
state_txn_users.isnull().sum()
```

```
Out[19]: State          0
Year          0
Quarter       0
Transactions  0
Amount (INR)  0
ATV (INR)     0
Registered Users  0
App Opens     0
dtype: int64
```

```
In [20]: district_txn_users.isnull().sum()
```

```
Out[20]: State          0
Year          0
Quarter       0
District      0
Code         28
Transactions  0
Amount (INR)  0
ATV (INR)     4
Registered Users  0
App Opens     0
dtype: int64
```

```
In [21]: district_txn_users.dropna(subset=['ATV (INR)'], inplace = True)
district_txn_users.isnull().sum()
```

```
Out[21]: State          0
Year          0
Quarter       0
District      0
Code         28
Transactions  0
Amount (INR)  0
ATV (INR)     0
Registered Users  0
App Opens     0
dtype: int64
```

Create a summary

```
In [51]: # 1. Calculate the total number of states and the total number of districts.
```

```
total_states = district_demo['State'].nunique()
total_districts = district_demo['District'].nunique()

print(f" Total States: {total_states}")
print(f" Total Districts: {total_districts}")
```

Total States: 36

Total Districts: 736

```
In [22]: #Identify the state with the highest number of districts.
district_count_per_state = district_demo['State'].value_counts()
max_state = district_count_per_state.idxmax()
```



```
max_count = district_count_per_state.max()
print(f"State with highest number of districts: '{max_state}' → {max_count} districts")
```

State with highest number of districts: 'Uttar Pradesh' → 75 districts

Exploratory Data Analysis

```
In [23]: # Analyze transaction trends over the years for each state
# Calculate the total number of transactions and total transaction amount for each state
from tabulate import tabulate

yearly_trends = state_txn_users.groupby(["State", "Year"])[["Transactions", "Amount"])
print("Total Transactions & Amount by State Over the Years")
print(tabulate(yearly_trends, headers='keys', tablefmt='grid'))
```

Total Transactions & Amount by State Over the Years

+-----+-----+-----+-----+-----+				
-----+				
	State		Year	Transactions Amount
(INR)				
+=====+=====+=====+=====+				
=====+				
0	Andaman & Nicobar Islands		2018	58021 1.890
76e+08				
+-----+-----+-----+-----+-----+				
-----+				
1	Andaman & Nicobar Islands		2019	133104 4.734
65e+08				
+-----+-----+-----+-----+-----+				
-----+				
2	Andaman & Nicobar Islands		2020	446274 1.296
42e+09				
+-----+-----+-----+-----+-----+				
-----+				
3	Andaman & Nicobar Islands		2021	586166 1.682
85e+09				
+-----+-----+-----+-----+-----+				
-----+				
4	Andhra Pradesh		2018	77779112 1.220
72e+11				
+-----+-----+-----+-----+-----+				
-----+				
5	Andhra Pradesh		2019	297180254 5.377
91e+11				
+-----+-----+-----+-----+-----+				
-----+				
6	Andhra Pradesh		2020	763616699 1.677
25e+12				
+-----+-----+-----+-----+-----+				
-----+				
7	Andhra Pradesh		2021	352767134 8.507
37e+11				
+-----+-----+-----+-----+-----+				
-----+				
8	Arunachal Pradesh		2018	435229 1.127
12e+09				
+-----+-----+-----+-----+-----+				
-----+				
9	Arunachal Pradesh		2019	1314871 3.465
82e+09				
+-----+-----+-----+-----+-----+				
-----+				
10	Arunachal Pradesh		2020	3547905 9.388
68e+09				
+-----+-----+-----+-----+-----+				
-----+				
11	Arunachal Pradesh		2021	2745794 8.270
2e+09				
+-----+-----+-----+-----+-----+				
-----+				
12	Assam		2018	8806777 1.320
75e+10				
+-----+-----+-----+-----+-----+				
-----+				
13	Assam		2019	22691015 4.718

12e+09				
+-----+				
-----+				
29	Dadra & Nagar Haveli and Daman & Diu	2019	2559192	3.855
92e+09				
+-----+				
-----+				
30	Dadra & Nagar Haveli and Daman & Diu	2020	4807834	7.095
44e+09				
+-----+				
-----+				
31	Dadra & Nagar Haveli and Daman & Diu	2021	4050327	6.123
3e+09				
+-----+				
-----+				
32	Delhi	2018	64231244	9.575
65e+10				
+-----+				
-----+				
33	Delhi	2019	254461712	3.723
97e+11				
+-----+				
-----+				
34	Delhi	2020	364821900	6.329
19e+11				
+-----+				
-----+				
35	Delhi	2021	327516268	5.488
69e+11				
+-----+				
-----+				
36	Goa	2018	1244738	2.648
63e+09				
+-----+				
-----+				
37	Goa	2019	4114941	7.991
02e+09				
+-----+				
-----+				
38	Goa	2020	9080241	1.586
21e+10				
+-----+				
-----+				
39	Goa	2021	10041684	1.777
01e+10				
+-----+				
-----+				
40	Gujarat	2018	39761960	6.243
81e+10				
+-----+				
-----+				
41	Gujarat	2019	134749574	2.213
3e+11				
+-----+				
-----+				
42	Gujarat	2020	231865328	4.276
98e+11				
+-----+				
-----+				
43	Gujarat	2021	206615961	3.938

63e+11									
+-----+									
-----+									
44		Haryana		2018		31843908		5.987	
99e+10									
+-----+									
-----+									
45		Haryana		2019		113047107		1.984	
02e+11									
+-----+									
-----+									
46		Haryana		2020		226926755		4.322	
54e+11									
+-----+									
-----+									
47		Haryana		2021		195933640		3.692	
96e+11									
+-----+									
-----+									
48		Himachal Pradesh		2018		3364250		6.187	
25e+09									
+-----+									
-----+									
49		Himachal Pradesh		2019		10922850		2.110	
05e+10									
+-----+									
-----+									
50		Himachal Pradesh		2020		21602414		3.996	
15e+10									
+-----+									
-----+									
51		Himachal Pradesh		2021		17097931		3.061	
62e+10									
+-----+									
-----+									
52		Jammu & Kashmir		2018		7763165		1.325	
6e+10									
+-----+									
-----+									
53		Jammu & Kashmir		2019		7487796		1.772	
59e+10									
+-----+									
-----+									
54		Jammu & Kashmir		2020		12776978		3.856	
14e+10									
+-----+									
-----+									
55		Jammu & Kashmir		2021		17025389		3.995	
21e+10									
+-----+									
-----+									
56		Jharkhand		2018		19737665		2.599	
93e+10									
+-----+									
-----+									
57		Jharkhand		2019		51985184		8.186	
37e+10									
+-----+									
-----+									
58		Jharkhand		2020		104924330		1.945	

25e+11									
+-----+									
-----+									
59		Jharkhand		2021		98623808		1.881	
82e+11									
+-----+									
-----+									
60		Karnataka		2018		99925678		1.739	
67e+11									
+-----+									
-----+									
61		Karnataka		2019		610519200		7.912	
62e+11									
+-----+									
-----+									
62		Karnataka		2020		1216153117		1.803	
28e+12									
+-----+									
-----+									
63		Karnataka		2021		1054446538		1.592	
88e+12									
+-----+									
-----+									
64		Kerala		2018		11524547		1.936	
e+10									
+-----+									
-----+									
65		Kerala		2019		35537598		6.084	
75e+10									
+-----+									
-----+									
66		Kerala		2020		87068356		1.492	
65e+11									
+-----+									
-----+									
67		Kerala		2021		89507375		1.434	
88e+11									
+-----+									
-----+									
68		Ladakh		2018		81174		2.794	
82e+08									
+-----+									
-----+									
69		Ladakh		2019		292019		1.067	
93e+09									
+-----+									
-----+									
70		Ladakh		2020		831785		2.848	
88e+09									
+-----+									
-----+									
71		Ladakh		2021		675131		2.410	
68e+09									
+-----+									
-----+									
72		Lakshadweep		2018		6255		1.691	
87e+07									
+-----+									
-----+									
73		Lakshadweep		2019		12276		3.895	

03e+07				
+-----+-----+-----+-----+-----+				
-----+				
74	Lakshadweep	2020	32610	8.186
34e+07				
+-----+-----+-----+-----+-----+				
-----+				
75	Lakshadweep	2021	20469	5.442
62e+07				
+-----+-----+-----+-----+-----+				
-----+				
76	Madhya Pradesh	2018	57111347	8.266
1e+10				
+-----+-----+-----+-----+-----+				
-----+				
77	Madhya Pradesh	2019	199889462	2.987
69e+11				
+-----+-----+-----+-----+-----+				
-----+				
78	Madhya Pradesh	2020	417939741	7.646
36e+11				
+-----+-----+-----+-----+-----+				
-----+				
79	Madhya Pradesh	2021	425313178	7.690
35e+11				
+-----+-----+-----+-----+-----+				
-----+				
80	Maharashtra	2018	116301535	1.898
48e+11				
+-----+-----+-----+-----+-----+				
-----+				
81	Maharashtra	2019	526225123	7.373
27e+11				
+-----+-----+-----+-----+-----+				
-----+				
82	Maharashtra	2020	1099666770	1.678
82e+12				
+-----+-----+-----+-----+-----+				
-----+				
83	Maharashtra	2021	1091476726	1.685
e+12				
+-----+-----+-----+-----+-----+				
-----+				
84	Manipur	2018	661158	1.370
27e+09				
+-----+-----+-----+-----+-----+				
-----+				
85	Manipur	2019	1317186	3.447
14e+09				
+-----+-----+-----+-----+-----+				
-----+				
86	Manipur	2020	4949889	1.601
57e+10				
+-----+-----+-----+-----+-----+				
-----+				
87	Manipur	2021	5389810	1.496
01e+10				
+-----+-----+-----+-----+-----+				
-----+				
88	Meghalaya	2018	388850	7.306

94e+08				
+-----+				
-----+				
89	Meghalaya	2019	1113558	2.246
62e+09				
+-----+				
-----+				
90	Meghalaya	2020	2489265	5.315
17e+09				
+-----+				
-----+				
91	Meghalaya	2021	1657240	4.249
13e+09				
+-----+				
-----+				
92	Mizoram	2018	140170	4.357
63e+08				
+-----+				
-----+				
93	Mizoram	2019	369310	1.113
66e+09				
+-----+				
-----+				
94	Mizoram	2020	929381	2.543
74e+09				
+-----+				
-----+				
95	Mizoram	2021	723915	2.223
98e+09				
+-----+				
-----+				
96	Nagaland	2018	342148	8.611
38e+08				
+-----+				
-----+				
97	Nagaland	2019	936380	2.447
5e+09				
+-----+				
-----+				
98	Nagaland	2020	2479761	6.815
19e+09				
+-----+				
-----+				
99	Nagaland	2021	2106688	6.263
74e+09				
+-----+				
-----+				
100	Odisha	2018	65162918	5.964
03e+10				
+-----+				
-----+				
101	Odisha	2019	169961871	2.172
56e+11				
+-----+				
-----+				
102	Odisha	2020	262069662	4.844
56e+11				
+-----+				
-----+				
103	Odisha	2021	243284695	4.592

62e+11				
+-----+				
-----+				
104 Puducherry		2018		732708 1.494
98e+09				
+-----+				
-----+				
105 Puducherry		2019		2810650 5.510
66e+09				
+-----+				
-----+				
106 Puducherry		2020		6688209 1.269
39e+10				
+-----+				
-----+				
107 Puducherry		2021		7060819 1.239
81e+10				
+-----+				
-----+				
108 Punjab		2018		12800841 2.531
31e+10				
+-----+				
-----+				
109 Punjab		2019		40087404 8.508
49e+10				
+-----+				
-----+				
110 Punjab		2020		69506576 1.555
57e+11				
+-----+				
-----+				
111 Punjab		2021		58942083 1.282
22e+11				
+-----+				
-----+				
112 Rajasthan		2018		52782208 8.643
52e+10				
+-----+				
-----+				
113 Rajasthan		2019		246343185 4.221
69e+11				
+-----+				
-----+				
114 Rajasthan		2020		543585579 1.063
78e+12				
+-----+				
-----+				
115 Rajasthan		2021		540207958 1.053
2e+12				
+-----+				
-----+				
116 Sikkim		2018		381689 8.265
66e+08				
+-----+				
-----+				
117 Sikkim		2019		1948037 3.258
11e+09				
+-----+				
-----+				
118 Sikkim		2020		2377319 5.428

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[illegible]

Massive growth in digital transactions from 2018 to 2020 across almost all states. Regional pattern:- -South India dominates: Karnataka, Telangana, Andhra Pradesh, Tamil Nadu, Kerala -North & West India strong: Maharashtra, Rajasthan, Gujarat, Delhi, UP -Northeast & UTs lagging: Mizoram, Nagaland, Ladakh, Lakshadweep

```
In [26]: #Identify the top 5 states with the highest transaction volumes and the top 5 s
state_total_txn = state_txn_users.groupby("State")["Transactions"].sum().sort_va
top5_states = state_total_txn.head(5)
bottom5_states = state_total_txn.tail(5)
print("Top five states:-")
print(top5_states)
print()
print("Botton five states:-")
print(bottom5 states)
```

Top five states:-

State

Karnataka 2981044533

Maharashtra 2833670154

Telangana 2347430243

Andhra Pradesh 1491343199

Rajasthan 1382918930

Name: Transactions, dtype: int64

Bottom five states:-

State

Meghalaya 5648913

Mizoram 2162776

Ladakh 1880109

Andaman & Nicobar Islands 1223565

Lakshadweep 71610

Name: Transactions, dtype: int64

```
In [27]: # Identify the most common transaction types in each state and quarter
# 1. For each state and quarter, determine the most frequent transaction type. D
most_common_txn = state_txn_split.sort_values(by = ["Transactions"], ascending =
most_common_txn = most_common_txn[['State', 'Year', 'Quarter', 'Transaction Type

print(" Most Common Transaction Type per State & Quarter")
print(tabulate(most_common_txn, headers='keys', tablefmt='grid'))
```

Most Common Transaction Type per State & Quarter

State	Year	Quarter	Transaction Type	Transactions
Andaman & Nicobar Islands	2018	1	Recharge & bill payments	4200
Andaman & Nicobar Islands	2018	2	Recharge & bill payments	6735
Andaman & Nicobar Islands	2018	3	Recharge & bill payments	8636
Andaman & Nicobar Islands	2018	4	Recharge & bill payments	11517
Andaman & Nicobar Islands	2019	1	Recharge & bill payments	15263
Andaman & Nicobar Islands	2019	2	Recharge & bill payments	14676
Andaman & Nicobar Islands	2019	3	Recharge & bill payments	16219
Andaman & Nicobar Islands	2019	4	Peer-to-peer payments	18128
Andaman & Nicobar Islands	2020	1	Peer-to-peer payments	18324
Andaman & Nicobar Islands	2020	2	Recharge & bill payments	38125
Andaman & Nicobar Islands	2020	3	Recharge & bill payments	59310
Andaman & Nicobar Islands	2020	4	Peer-to-peer payments	81439
Andaman & Nicobar Islands	2021	1	Peer-to-peer payments	105458
Andaman & Nicobar Islands	2021	2	Peer-to-peer	

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11 payments	28729			
+-----+-----+-----+-----+				
29 Arunachal Pradesh		2018	2 Recharge & bi	
11 payments	50700			
+-----+-----+-----+-----+				
30 Arunachal Pradesh		2018	3 Recharge & bi	
11 payments	74122			
+-----+-----+-----+-----+				
31 Arunachal Pradesh		2018	4 Recharge & bi	
11 payments	97751			
+-----+-----+-----+-----+				
32 Arunachal Pradesh		2019	1 Recharge & bi	
11 payments	121303			
+-----+-----+-----+-----+				
33 Arunachal Pradesh		2019	2 Recharge & bi	
11 payments	131988			
+-----+-----+-----+-----+				
34 Arunachal Pradesh		2019	3 Recharge & bi	
11 payments	216228			
+-----+-----+-----+-----+				
35 Arunachal Pradesh		2019	4 Recharge & bi	
11 payments	259183			
+-----+-----+-----+-----+				
36 Arunachal Pradesh		2020	1 Recharge & bi	
11 payments	329834			
+-----+-----+-----+-----+				
37 Arunachal Pradesh		2020	2 Recharge & bi	
11 payments	522495			
+-----+-----+-----+-----+				
38 Arunachal Pradesh		2020	3 Recharge & bi	
11 payments	514907			
+-----+-----+-----+-----+				
39 Arunachal Pradesh		2020	4 Peer-to-peer	
payments	522019			
+-----+-----+-----+-----+				
40 Arunachal Pradesh		2021	1 Peer-to-peer	
payments	566209			
+-----+-----+-----+-----+				
41 Arunachal Pradesh		2021	2 Peer-to-peer	
payments	762946			
+-----+-----+-----+-----+				
42 Assam		2018	1 Recharge & bi	
11 payments	632092			
+-----+-----+-----+-----+				
43 Assam		2018	2 Recharge & bi	

11 payments	984160			
+-----+-----+-----+-----+-----+				
44 Assam		2018	3	Recharge & bi
11 payments	1275136			
+-----+-----+-----+-----+-----+				
45 Assam		2018	4	Recharge & bi
11 payments	1703488			
+-----+-----+-----+-----+-----+				
46 Assam		2019	1	Recharge & bi
11 payments	1993220			
+-----+-----+-----+-----+-----+				
47 Assam		2019	2	Recharge & bi
11 payments	2512932			
+-----+-----+-----+-----+-----+				
48 Assam		2019	3	Peer-to-peer
payments	2713539			
+-----+-----+-----+-----+-----+				
49 Assam		2019	4	Peer-to-peer
payments	3222143			
+-----+-----+-----+-----+-----+				
50 Assam		2020	1	Peer-to-peer
payments	4058740			
+-----+-----+-----+-----+-----+				
51 Assam		2020	2	Recharge & bi
11 payments	6045321			
+-----+-----+-----+-----+-----+				
52 Assam		2020	3	Peer-to-peer
payments	5637893			
+-----+-----+-----+-----+-----+				
53 Assam		2020	4	Peer-to-peer
payments	7538478			
+-----+-----+-----+-----+-----+				
54 Assam		2021	1	Peer-to-peer
payments	9449096			
+-----+-----+-----+-----+-----+				
55 Assam		2021	2	Peer-to-peer
payments	11668399			
+-----+-----+-----+-----+-----+				
56 Bihar		2018	1	Recharge & bi
11 payments	3159922			
+-----+-----+-----+-----+-----+				
57 Bihar		2018	2	Recharge & bi
11 payments	4346849			
+-----+-----+-----+-----+-----+				
58 Bihar		2018	3	Peer-to-peer

payments	8893764				
-----+					
59 Bihar			2018	4	Peer-to-peer
payments	8094296				
-----+					
60 Bihar			2019	1	Peer-to-peer
payments	16807040				
-----+					
61 Bihar			2019	2	Peer-to-peer
payments	15837449				
-----+					
62 Bihar			2019	3	Peer-to-peer
payments	15446119				
-----+					
63 Bihar			2019	4	Peer-to-peer
payments	26337842				
-----+					
64 Bihar			2020	1	Peer-to-peer
payments	23163922				
-----+					
65 Bihar			2020	2	Peer-to-peer
payments	26572651				
-----+					
66 Bihar			2020	3	Peer-to-peer
payments	37294332				
-----+					
67 Bihar			2020	4	Peer-to-peer
payments	49432098				
-----+					
68 Bihar			2021	1	Peer-to-peer
payments	58566582				
-----+					
69 Bihar			2021	2	Peer-to-peer
payments	78694099				
-----+					
70 Chandigarh			2018	1	Recharge & bi
ll payments	201262				
-----+					
71 Chandigarh			2018	2	Recharge & bi
ll payments	224548				
-----+					
72 Chandigarh			2018	3	Peer-to-peer
payments	295358				
-----+					
73 Chandigarh			2018	4	Peer-to-peer

payments	431461			
+-----+-----+-----+-----+-----				
-----+-----+-----+-----+-----				
74 Chandigarh		2019	1	Peer-to-peer
payments	689400			
+-----+-----+-----+-----+-----				
-----+-----+-----+-----+-----				
75 Chandigarh		2019	2	Peer-to-peer
payments	604849			
+-----+-----+-----+-----+-----				
-----+-----+-----+-----+-----				
76 Chandigarh		2019	3	Peer-to-peer
payments	722233			
+-----+-----+-----+-----+-----				
-----+-----+-----+-----+-----				
77 Chandigarh		2019	4	Peer-to-peer
payments	927850			
+-----+-----+-----+-----+-----				
-----+-----+-----+-----+-----				
78 Chandigarh		2020	1	Peer-to-peer
payments	1087401			
+-----+-----+-----+-----+-----				
-----+-----+-----+-----+-----				
79 Chandigarh		2020	2	Peer-to-peer
payments	766698			
+-----+-----+-----+-----+-----				
-----+-----+-----+-----+-----				
80 Chandigarh		2020	3	Peer-to-peer
payments	981986			
+-----+-----+-----+-----+-----				
-----+-----+-----+-----+-----				
81 Chandigarh		2020	4	Merchant paym
ents	1322026			
+-----+-----+-----+-----+-----				
-----+-----+-----+-----+-----				
82 Chandigarh		2021	1	Merchant paym
ents	1799072			
+-----+-----+-----+-----+-----				
-----+-----+-----+-----+-----				
83 Chandigarh		2021	2	Merchant paym
ents	1926913			
+-----+-----+-----+-----+-----				
-----+-----+-----+-----+-----				
84 Chhattisgarh		2018	1	Recharge & bi
ll payments	1177618			
+-----+-----+-----+-----+-----				
-----+-----+-----+-----+-----				
85 Chhattisgarh		2018	2	Recharge & bi
ll payments	1643461			
+-----+-----+-----+-----+-----				
-----+-----+-----+-----+-----				
86 Chhattisgarh		2018	3	Recharge & bi
ll payments	1911374			
+-----+-----+-----+-----+-----				
-----+-----+-----+-----+-----				
87 Chhattisgarh		2018	4	Recharge & bi
ll payments	2438959			
+-----+-----+-----+-----+-----				
-----+-----+-----+-----+-----				
88 Chhattisgarh		2019	1	Peer-to-peer

payments	4068056			
+-----+-----+-----+-----+-----+				
89 Chhattisgarh		2019	2	Peer-to-peer
payments	4350167			
+-----+-----+-----+-----+-----+				
90 Chhattisgarh		2019	3	Peer-to-peer
payments	5021844			
+-----+-----+-----+-----+-----+				
91 Chhattisgarh		2019	4	Peer-to-peer
payments	7241974			
+-----+-----+-----+-----+-----+				
92 Chhattisgarh		2020	1	Peer-to-peer
payments	8109789			
+-----+-----+-----+-----+-----+				
93 Chhattisgarh		2020	2	Recharge & bi
ll payments	8366200			
+-----+-----+-----+-----+-----+				
94 Chhattisgarh		2020	3	Peer-to-peer
payments	9734445			
+-----+-----+-----+-----+-----+				
95 Chhattisgarh		2020	4	Peer-to-peer
payments	14257312			
+-----+-----+-----+-----+-----+				
96 Chhattisgarh		2021	1	Peer-to-peer
payments	15621154			
+-----+-----+-----+-----+-----+				
97 Chhattisgarh		2021	2	Peer-to-peer
payments	18387345			
+-----+-----+-----+-----+-----+				
98 Dadra & Nagar Haveli and Daman & Diu		2018	1	Recharge & bi
ll payments	95544			
+-----+-----+-----+-----+-----+				
99 Dadra & Nagar Haveli and Daman & Diu		2018	2	Recharge & bi
ll payments	122834			
+-----+-----+-----+-----+-----+				
100 Dadra & Nagar Haveli and Daman & Diu		2018	3	Recharge & bi
ll payments	157113			
+-----+-----+-----+-----+-----+				
101 Dadra & Nagar Haveli and Daman & Diu		2018	4	Peer-to-peer
payments	194214			
+-----+-----+-----+-----+-----+				
102 Dadra & Nagar Haveli and Daman & Diu		2019	1	Peer-to-peer
payments	408465			
+-----+-----+-----+-----+-----+				
103 Dadra & Nagar Haveli and Daman & Diu		2019	2	Peer-to-peer

payments	244134				
+-----+-----+-----+-----+-----+-----+					
-----+-----+-----+-----+-----+-----+					
104 Dadra & Nagar Haveli and Daman & Diu	2019	3	Recharge & bi	ll payments	319142
+-----+-----+-----+-----+-----+-----+					
-----+-----+-----+-----+-----+-----+					
105 Dadra & Nagar Haveli and Daman & Diu	2019	4	Recharge & bi	ll payments	351819
+-----+-----+-----+-----+-----+-----+					
-----+-----+-----+-----+-----+-----+					
106 Dadra & Nagar Haveli and Daman & Diu	2020	1	Recharge & bi	ll payments	407577
+-----+-----+-----+-----+-----+-----+					
-----+-----+-----+-----+-----+-----+					
107 Dadra & Nagar Haveli and Daman & Diu	2020	2	Recharge & bi	ll payments	525974
+-----+-----+-----+-----+-----+-----+					
-----+-----+-----+-----+-----+-----+					
108 Dadra & Nagar Haveli and Daman & Diu	2020	3	Recharge & bi	ll payments	455603
+-----+-----+-----+-----+-----+-----+					
-----+-----+-----+-----+-----+-----+					
109 Dadra & Nagar Haveli and Daman & Diu	2020	4	Peer-to-peer	payments	666995
+-----+-----+-----+-----+-----+-----+					
-----+-----+-----+-----+-----+-----+					
110 Dadra & Nagar Haveli and Daman & Diu	2021	1	Peer-to-peer	payments	768921
+-----+-----+-----+-----+-----+-----+					
-----+-----+-----+-----+-----+-----+					
111 Dadra & Nagar Haveli and Daman & Diu	2021	2	Peer-to-peer	payments	843550
+-----+-----+-----+-----+-----+-----+					
-----+-----+-----+-----+-----+-----+					
112 Delhi	2018	1	Recharge & bi	ll payments	3947297
+-----+-----+-----+-----+-----+-----+					
-----+-----+-----+-----+-----+-----+					
113 Delhi	2018	2	Recharge & bi	ll payments	4511737
+-----+-----+-----+-----+-----+-----+					
-----+-----+-----+-----+-----+-----+					
114 Delhi	2018	3	Peer-to-peer	payments	8557153
+-----+-----+-----+-----+-----+-----+					
-----+-----+-----+-----+-----+-----+					
115 Delhi	2018	4	Peer-to-peer	payments	9973249
+-----+-----+-----+-----+-----+-----+					
-----+-----+-----+-----+-----+-----+					
116 Delhi	2019	1	Peer-to-peer	payments	20216287
+-----+-----+-----+-----+-----+-----+					
-----+-----+-----+-----+-----+-----+					
117 Delhi	2019	2	Merchant paym	ents	20891431
+-----+-----+-----+-----+-----+-----+					
-----+-----+-----+-----+-----+-----+					
118 Delhi	2019	3	Merchant paym		

ents	29453368			
+-----+-----+-----+-----+-----+				
119 Delhi		2019	4	Peer-to-peer
payments	33040093			
+-----+-----+-----+-----+-----+				
120 Delhi		2020	1	Merchant paym
ents	33951545			
+-----+-----+-----+-----+-----+				
121 Delhi		2020	2	Peer-to-peer
payments	27155938			
+-----+-----+-----+-----+-----+				
122 Delhi		2020	3	Peer-to-peer
payments	41498638			
+-----+-----+-----+-----+-----+				
123 Delhi		2020	4	Merchant paym
ents	54581166			
+-----+-----+-----+-----+-----+				
124 Delhi		2021	1	Merchant paym
ents	72615587			
+-----+-----+-----+-----+-----+				
125 Delhi		2021	2	Merchant paym
ents	75620295			
+-----+-----+-----+-----+-----+				
126 Goa		2018	1	Recharge & bi
ll payments	85991			
+-----+-----+-----+-----+-----+				
127 Goa		2018	2	Recharge & bi
ll payments	120943			
+-----+-----+-----+-----+-----+				
128 Goa		2018	3	Recharge & bi
ll payments	158797			
+-----+-----+-----+-----+-----+				
129 Goa		2018	4	Peer-to-peer
payments	246426			
+-----+-----+-----+-----+-----+				
130 Goa		2019	1	Peer-to-peer
payments	378848			
+-----+-----+-----+-----+-----+				
131 Goa		2019	2	Peer-to-peer
payments	373759			
+-----+-----+-----+-----+-----+				
132 Goa		2019	3	Peer-to-peer
payments	475178			
+-----+-----+-----+-----+-----+				
133 Goa		2019	4	Peer-to-peer

payments	698728			
+-----+-----+-----+-----+-----+				
134 Goa		2020	1	Peer-to-peer
payments	817198			
+-----+-----+-----+-----+-----+				
135 Goa		2020	2	Recharge & bi
ll payments	758617			
+-----+-----+-----+-----+-----+				
136 Goa		2020	3	Peer-to-peer
payments	759351			
+-----+-----+-----+-----+-----+				
137 Goa		2020	4	Peer-to-peer
payments	1550251			
+-----+-----+-----+-----+-----+				
138 Goa		2021	1	Peer-to-peer
payments	2235456			
+-----+-----+-----+-----+-----+				
139 Goa		2021	2	Merchant paym
ents	1869384			
+-----+-----+-----+-----+-----+				
140 Gujarat		2018	1	Recharge & bi
ll payments	3691952			
+-----+-----+-----+-----+-----+				
141 Gujarat		2018	2	Recharge & bi
ll payments	4643367			
+-----+-----+-----+-----+-----+				
142 Gujarat		2018	3	Peer-to-peer
payments	5287200			
+-----+-----+-----+-----+-----+				
143 Gujarat		2018	4	Peer-to-peer
payments	6488202			
+-----+-----+-----+-----+-----+				
144 Gujarat		2019	1	Peer-to-peer
payments	13465044			
+-----+-----+-----+-----+-----+				
145 Gujarat		2019	2	Peer-to-peer
payments	12547493			
+-----+-----+-----+-----+-----+				
146 Gujarat		2019	3	Peer-to-peer
payments	14529353			
+-----+-----+-----+-----+-----+				
147 Gujarat		2019	4	Peer-to-peer
payments	19107911			
+-----+-----+-----+-----+-----+				
148 Gujarat		2020	1	Peer-to-peer

payments	19068093			
149 Gujarat		2020	2	Recharge & bi
11 payments	19971660			
150 Gujarat		2020	3	Peer-to-peer
payments	23130724			
151 Gujarat		2020	4	Peer-to-peer
payments	29967258			
152 Gujarat		2021	1	Peer-to-peer
payments	36427493			
153 Gujarat		2021	2	Merchant paym
ents	42593432			
154 Haryana		2018	1	Recharge & bi
11 payments	2368002			
155 Haryana		2018	2	Recharge & bi
11 payments	3054284			
156 Haryana		2018	3	Peer-to-peer
payments	3753981			
157 Haryana		2018	4	Peer-to-peer
payments	5905032			
158 Haryana		2019	1	Peer-to-peer
payments	12622225			
159 Haryana		2019	2	Peer-to-peer
payments	10387562			
160 Haryana		2019	3	Peer-to-peer
payments	11775288			
161 Haryana		2019	4	Peer-to-peer
payments	15729819			
162 Haryana		2020	1	Peer-to-peer
payments	17728235			
163 Haryana		2020	2	Peer-to-peer

payments	17334369			
+-----+-----+-----+-----+-----				
-----+-----+-----+-----+-----				
164 Haryana		2020	3	Peer-to-peer
payments	24123449			
+-----+-----+-----+-----+-----				
-----+-----+-----+-----+-----				
165 Haryana		2020	4	Merchant paym
ents	34063692			
+-----+-----+-----+-----+-----				
-----+-----+-----+-----+-----				
166 Haryana		2021	1	Merchant paym
ents	39363588			
+-----+-----+-----+-----+-----				
-----+-----+-----+-----+-----				
167 Haryana		2021	2	Merchant paym
ents	45335533			
+-----+-----+-----+-----+-----				
-----+-----+-----+-----+-----				
168 Himachal Pradesh		2018	1	Recharge & bi
ll payments	284371			
+-----+-----+-----+-----+-----				
-----+-----+-----+-----+-----				
169 Himachal Pradesh		2018	2	Recharge & bi
ll payments	385642			
+-----+-----+-----+-----+-----				
-----+-----+-----+-----+-----				
170 Himachal Pradesh		2018	3	Recharge & bi
ll payments	457449			
+-----+-----+-----+-----+-----				
-----+-----+-----+-----+-----				
171 Himachal Pradesh		2018	4	Recharge & bi
ll payments	598325			
+-----+-----+-----+-----+-----				
-----+-----+-----+-----+-----				
172 Himachal Pradesh		2019	1	Peer-to-peer
payments	1178280			
+-----+-----+-----+-----+-----				
-----+-----+-----+-----+-----				
173 Himachal Pradesh		2019	2	Peer-to-peer
payments	1141873			
+-----+-----+-----+-----+-----				
-----+-----+-----+-----+-----				
174 Himachal Pradesh		2019	3	Recharge & bi
ll payments	1212659			
+-----+-----+-----+-----+-----				
-----+-----+-----+-----+-----				
175 Himachal Pradesh		2019	4	Peer-to-peer
payments	1579582			
+-----+-----+-----+-----+-----				
-----+-----+-----+-----+-----				
176 Himachal Pradesh		2020	1	Recharge & bi
ll payments	1815157			
+-----+-----+-----+-----+-----				
-----+-----+-----+-----+-----				
177 Himachal Pradesh		2020	2	Recharge & bi
ll payments	2558935			
+-----+-----+-----+-----+-----				
-----+-----+-----+-----+-----				
178 Himachal Pradesh		2020	3	Recharge & bi

11 payments	2416395				
+-----+-----+-----+-----+-----+					
179 Himachal Pradesh		2020	4	Recharge & bi	
11 payments	2638030				
+-----+-----+-----+-----+-----+					
180 Himachal Pradesh		2021	1	Peer-to-peer	
payments	2845733				
+-----+-----+-----+-----+-----+					
181 Himachal Pradesh		2021	2	Peer-to-peer	
payments	3340531				
+-----+-----+-----+-----+-----+					
182 Jammu & Kashmir		2018	1	Recharge & bi	
11 payments	457813				
+-----+-----+-----+-----+-----+					
183 Jammu & Kashmir		2018	2	Recharge & bi	
11 payments	794502				
+-----+-----+-----+-----+-----+					
184 Jammu & Kashmir		2018	3	Peer-to-peer	
payments	1260453				
+-----+-----+-----+-----+-----+					
185 Jammu & Kashmir		2018	4	Peer-to-peer	
payments	1265457				
+-----+-----+-----+-----+-----+					
186 Jammu & Kashmir		2019	1	Peer-to-peer	
payments	1913720				
+-----+-----+-----+-----+-----+					
187 Jammu & Kashmir		2019	2	Peer-to-peer	
payments	1180781				
+-----+-----+-----+-----+-----+					
188 Jammu & Kashmir		2019	3	Peer-to-peer	
payments	618694				
+-----+-----+-----+-----+-----+					
189 Jammu & Kashmir		2019	4	Peer-to-peer	
payments	310620				
+-----+-----+-----+-----+-----+					
190 Jammu & Kashmir		2020	1	Peer-to-peer	
payments	435154				
+-----+-----+-----+-----+-----+					
191 Jammu & Kashmir		2020	2	Peer-to-peer	
payments	1238380				
+-----+-----+-----+-----+-----+					
192 Jammu & Kashmir		2020	3	Peer-to-peer	
payments	1787154				
+-----+-----+-----+-----+-----+					
193 Jammu & Kashmir		2020	4	Peer-to-peer	

payments	2378539				
-----+					
194 Jammu & Kashmir		2021	1	Peer-to-peer	
payments	2800201				
-----+					
195 Jammu & Kashmir		2021	2	Peer-to-peer	
payments	3955437				
-----+					
196 Jharkhand		2018	1	Recharge & bi	
11 payments	1095857				
-----+					
197 Jharkhand		2018	2	Recharge & bi	
11 payments	1398777				
-----+					
198 Jharkhand		2018	3	Peer-to-peer	
payments	6003688				
-----+					
199 Jharkhand		2018	4	Peer-to-peer	
payments	3325473				
-----+					
200 Jharkhand		2019	1	Peer-to-peer	
payments	5952105				
-----+					
201 Jharkhand		2019	2	Peer-to-peer	
payments	5155937				
-----+					
202 Jharkhand		2019	3	Peer-to-peer	
payments	5708187				
-----+					
203 Jharkhand		2019	4	Peer-to-peer	
payments	10301226				
-----+					
204 Jharkhand		2020	1	Peer-to-peer	
payments	8196850				
-----+					
205 Jharkhand		2020	2	Peer-to-peer	
payments	8724053				
-----+					
206 Jharkhand		2020	3	Peer-to-peer	
payments	11984094				
-----+					
207 Jharkhand		2020	4	Peer-to-peer	
payments	17120664				
-----+					
208 Jharkhand		2021	1	Peer-to-peer	

payments	19151083			
-----+				
209 Jharkhand		2021	2	Peer-to-peer
payments	24184568			
-----+				
210 Karnataka		2018	1	Recharge & bi
11 payments	5785292			
-----+				
211 Karnataka		2018	2	Recharge & bi
11 payments	7391926			
-----+				
212 Karnataka		2018	3	Peer-to-peer
payments	12863507			
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213 Karnataka		2018	4	Peer-to-peer
payments	20471744			
-----+				
214 Karnataka		2019	1	Peer-to-peer
payments	44049036			
-----+				
215 Karnataka		2019	2	Peer-to-peer
payments	50033334			
-----+				
216 Karnataka		2019	3	Merchant paym
ents	76924325			
-----+				
217 Karnataka		2019	4	Merchant paym
ents	114044901			
-----+				
218 Karnataka		2020	1	Merchant paym
ents	132970737			
-----+				
219 Karnataka		2020	2	Merchant paym
ents	87251639			
-----+				
220 Karnataka		2020	3	Merchant paym
ents	137206600			
-----+				
221 Karnataka		2020	4	Merchant paym
ents	215711211			
-----+				
222 Karnataka		2021	1	Merchant paym
ents	279599017			
-----+				
223 Karnataka		2021	2	Merchant paym

ents	244460862				
224 Kerala			2018	1	Recharge & bi
11 payments	988774				
225 Kerala			2018	2	Recharge & bi
11 payments	1230869				
226 Kerala			2018	3	Peer-to-peer
payments	1425259				
227 Kerala			2018	4	Peer-to-peer
payments	2073960				
228 Kerala			2019	1	Peer-to-peer
payments	3601116				
229 Kerala			2019	2	Peer-to-peer
payments	3519528				
230 Kerala			2019	3	Peer-to-peer
payments	4181954				
231 Kerala			2019	4	Peer-to-peer
payments	5859068				
232 Kerala			2020	1	Peer-to-peer
payments	6634439				
233 Kerala			2020	2	Recharge & bi
11 payments	7709714				
234 Kerala			2020	3	Peer-to-peer
payments	8590587				
235 Kerala			2020	4	Peer-to-peer
payments	12941135				
236 Kerala			2021	1	Peer-to-peer
payments	16209203				
237 Kerala			2021	2	Peer-to-peer
payments	17026648				
238 Ladakh			2018	1	Recharge & bi

11 payments	3550			
+-----+-----+-----+-----+-----+				
239 Ladakh		2018	2	Recharge & bi
11 payments	8075			
+-----+-----+-----+-----+-----+				
240 Ladakh		2018	3	Recharge & bi
11 payments	13136			
+-----+-----+-----+-----+-----+				
241 Ladakh		2018	4	Recharge & bi
11 payments	16650			
+-----+-----+-----+-----+-----+				
242 Ladakh		2019	1	Peer-to-peer
payments	22076			
+-----+-----+-----+-----+-----+				
243 Ladakh		2019	2	Peer-to-peer
payments	34202			
+-----+-----+-----+-----+-----+				
244 Ladakh		2019	3	Peer-to-peer
payments	43198			
+-----+-----+-----+-----+-----+				
245 Ladakh		2019	4	Peer-to-peer
payments	42095			
+-----+-----+-----+-----+-----+				
246 Ladakh		2020	1	Peer-to-peer
payments	51560			
+-----+-----+-----+-----+-----+				
247 Ladakh		2020	2	Recharge & bi
11 payments	70601			
+-----+-----+-----+-----+-----+				
248 Ladakh		2020	3	Peer-to-peer
payments	108345			
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249 Ladakh		2020	4	Peer-to-peer
payments	151582			
+-----+-----+-----+-----+-----+				
250 Ladakh		2021	1	Peer-to-peer
payments	141894			
+-----+-----+-----+-----+-----+				
251 Ladakh		2021	2	Peer-to-peer
payments	209818			
+-----+-----+-----+-----+-----+				
252 Lakshadweep		2018	1	Peer-to-peer
payments	423			
+-----+-----+-----+-----+-----+				
253 Lakshadweep		2018	2	Peer-to-peer

payments	1315				
-----+					
254 Lakshadweep			2018	3	Peer-to-peer
payments	841				
-----+					
255 Lakshadweep			2018	4	Recharge & bi
11 payments	792				
-----+					
256 Lakshadweep			2019	1	Peer-to-peer
payments	1183				
-----+					
257 Lakshadweep			2019	2	Recharge & bi
11 payments	1448				
-----+					
258 Lakshadweep			2019	3	Recharge & bi
11 payments	1528				
-----+					
259 Lakshadweep			2019	4	Recharge & bi
11 payments	1801				
-----+					
260 Lakshadweep			2020	1	Recharge & bi
11 payments	2684				
-----+					
261 Lakshadweep			2020	2	Recharge & bi
11 payments	4497				
-----+					
262 Lakshadweep			2020	3	Recharge & bi
11 payments	4696				
-----+					
263 Lakshadweep			2020	4	Recharge & bi
11 payments	5187				
-----+					
264 Lakshadweep			2021	1	Peer-to-peer
payments	3942				
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265 Lakshadweep			2021	2	Recharge & bi
11 payments	5499				
-----+					
266 Madhya Pradesh			2018	1	Recharge & bi
11 payments	4404190				
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267 Madhya Pradesh			2018	2	Recharge & bi
11 payments	5324535				
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268 Madhya Pradesh			2018	3	Peer-to-peer

payments	9988509				
+-----+-----+-----+-----+-----+					
269 Madhya Pradesh			2018	4	Peer-to-peer
payments	11456555				
+-----+-----+-----+-----+-----+					
270 Madhya Pradesh			2019	1	Peer-to-peer
payments	23708825				
+-----+-----+-----+-----+-----+					
271 Madhya Pradesh			2019	2	Peer-to-peer
payments	20868744				
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272 Madhya Pradesh			2019	3	Peer-to-peer
payments	22631038				
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273 Madhya Pradesh			2019	4	Peer-to-peer
payments	32083162				
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274 Madhya Pradesh			2020	1	Peer-to-peer
payments	34540722				
+-----+-----+-----+-----+-----+					
275 Madhya Pradesh			2020	2	Peer-to-peer
payments	34860958				
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276 Madhya Pradesh			2020	3	Peer-to-peer
payments	50871564				
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277 Madhya Pradesh			2020	4	Peer-to-peer
payments	67972167				
+-----+-----+-----+-----+-----+					
278 Madhya Pradesh			2021	1	Merchant paym
ents	84812245				
+-----+-----+-----+-----+-----+					
279 Madhya Pradesh			2021	2	Peer-to-peer
payments	99367521				
+-----+-----+-----+-----+-----+					
280 Maharashtra			2018	1	Recharge & bi
ll payments	9670237				
+-----+-----+-----+-----+-----+					
281 Maharashtra			2018	2	Recharge & bi
ll payments	12384216				
+-----+-----+-----+-----+-----+					
282 Maharashtra			2018	3	Recharge & bi
ll payments	14371791				
+-----+-----+-----+-----+-----+					
283 Maharashtra			2018	4	Peer-to-peer

payments	20824667			
+-----+-----+-----+-----+-----				
-----+-----+-----+-----+-----				
284 Maharashtra		2019	1	Peer-to-peer
payments	37360716			
+-----+-----+-----+-----+-----				
-----+-----+-----+-----+-----				
285 Maharashtra		2019	2	Peer-to-peer
payments	42546317			
+-----+-----+-----+-----+-----				
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286 Maharashtra		2019	3	Peer-to-peer
payments	57991699			
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-----+-----+-----+-----+-----				
287 Maharashtra		2019	4	Merchant paym
ents	80127804			
+-----+-----+-----+-----+-----				
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288 Maharashtra		2020	1	Merchant paym
ents	100337738			
+-----+-----+-----+-----+-----				
-----+-----+-----+-----+-----				
289 Maharashtra		2020	2	Peer-to-peer
payments	74295930			
+-----+-----+-----+-----+-----				
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290 Maharashtra		2020	3	Peer-to-peer
payments	108436214			
+-----+-----+-----+-----+-----				
-----+-----+-----+-----+-----				
291 Maharashtra		2020	4	Merchant paym
ents	189845640			
+-----+-----+-----+-----+-----				
-----+-----+-----+-----+-----				
292 Maharashtra		2021	1	Merchant paym
ents	253043309			
+-----+-----+-----+-----+-----				
-----+-----+-----+-----+-----				
293 Maharashtra		2021	2	Merchant paym
ents	247194293			
+-----+-----+-----+-----+-----				
-----+-----+-----+-----+-----				
294 Manipur		2018	1	Recharge & bi
ll payments	50212			
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-----+-----+-----+-----+-----				
295 Manipur		2018	2	Recharge & bi
ll payments	77991			
+-----+-----+-----+-----+-----				
-----+-----+-----+-----+-----				
296 Manipur		2018	3	Peer-to-peer
payments	95204			
+-----+-----+-----+-----+-----				
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297 Manipur		2018	4	Recharge & bi
ll payments	113507			
+-----+-----+-----+-----+-----				
-----+-----+-----+-----+-----				
298 Manipur		2019	1	Peer-to-peer

11 payments	108812				
+-----+-----+-----+-----+-----+					
314 Meghalaya					
11 payments	155949		2019	3	Recharge & bi
+-----+-----+-----+-----+-----+					
315 Meghalaya					
11 payments	175084		2019	4	Recharge & bi
+-----+-----+-----+-----+-----+					
316 Meghalaya					
11 payments	226214		2020	1	Recharge & bi
+-----+-----+-----+-----+-----+					
317 Meghalaya					
11 payments	382662		2020	2	Recharge & bi
+-----+-----+-----+-----+-----+					
318 Meghalaya					
11 payments	342484		2020	3	Recharge & bi
+-----+-----+-----+-----+-----+					
319 Meghalaya					
11 payments	350006		2020	4	Recharge & bi
+-----+-----+-----+-----+-----+					
320 Meghalaya					
payments	326993		2021	1	Peer-to-peer
+-----+-----+-----+-----+-----+					
321 Meghalaya					
11 payments	389959		2021	2	Recharge & bi
+-----+-----+-----+-----+-----+					
322 Mizoram					
11 payments	10155		2018	1	Recharge & bi
+-----+-----+-----+-----+-----+					
323 Mizoram					
11 payments	13550		2018	2	Recharge & bi
+-----+-----+-----+-----+-----+					
324 Mizoram					
payments	18564		2018	3	Peer-to-peer
+-----+-----+-----+-----+-----+					
325 Mizoram					
payments	26212		2018	4	Peer-to-peer
+-----+-----+-----+-----+-----+					
326 Mizoram					
payments	35126		2019	1	Peer-to-peer
+-----+-----+-----+-----+-----+					
327 Mizoram					
payments	37364		2019	2	Peer-to-peer
+-----+-----+-----+-----+-----+					
328 Mizoram					
			2019	3	Recharge & bi

11 payments	49073			
+-----+-----+-----+-----+-----+				
329 Mizoram		2019	4	Recharge & bi
11 payments	60511			
+-----+-----+-----+-----+-----+				
330 Mizoram		2020	1	Recharge & bi
11 payments	85067			
+-----+-----+-----+-----+-----+				
331 Mizoram		2020	2	Recharge & bi
11 payments	127592			
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332 Mizoram		2020	3	Recharge & bi
11 payments	132664			
+-----+-----+-----+-----+-----+				
333 Mizoram		2020	4	Peer-to-peer
payments	141038			
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334 Mizoram		2021	1	Peer-to-peer
payments	156386			
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335 Mizoram		2021	2	Peer-to-peer
payments	173064			
+-----+-----+-----+-----+-----+				
336 Nagaland		2018	1	Recharge & bi
11 payments	28198			
+-----+-----+-----+-----+-----+				
337 Nagaland		2018	2	Recharge & bi
11 payments	41959			
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338 Nagaland		2018	3	Recharge & bi
11 payments	54885			
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339 Nagaland		2018	4	Recharge & bi
11 payments	72881			
+-----+-----+-----+-----+-----+				
340 Nagaland		2019	1	Recharge & bi
11 payments	87596			
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341 Nagaland		2019	2	Recharge & bi
11 payments	92492			
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342 Nagaland		2019	3	Recharge & bi
11 payments	145812			
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343 Nagaland		2019	4	Recharge & bi

11 payments	172761			
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344 Nagaland		2020	1	Recharge & bi
11 payments	221741			
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345 Nagaland		2020	2	Recharge & bi
11 payments	328269			
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346 Nagaland		2020	3	Recharge & bi
11 payments	347494			
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347 Nagaland		2020	4	Peer-to-peer
payments	417393			
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348 Nagaland		2021	1	Peer-to-peer
payments	477346			
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349 Nagaland		2021	2	Peer-to-peer
payments	526966			
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350 Odisha		2018	1	Recharge & bi
11 payments	2874109			
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351 Odisha		2018	2	Peer-to-peer
payments	3989202			
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352 Odisha		2018	3	Peer-to-peer
payments	24472139			
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353 Odisha		2018	4	Peer-to-peer
payments	12285028			
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354 Odisha		2019	1	Peer-to-peer
payments	24117274			
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355 Odisha		2019	2	Peer-to-peer
payments	16455353			
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356 Odisha		2019	3	Peer-to-peer
payments	18490877			
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357 Odisha		2019	4	Peer-to-peer
payments	43284477			
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358 Odisha		2020	1	Peer-to-peer

payments	27110930			
359 Odisha	24520938	2020	2	Peer-to-peer
payments	34182172			
360 Odisha	47588728	2020	3	Peer-to-peer
payments	54417515	2021	1	Peer-to-peer
361 Odisha	66929109	2021	2	Peer-to-peer
payments	53125	2018	1	Recharge & bi
362 Puducherry	59867	2018	2	Recharge & bi
ll payments	101817	2018	3	Peer-to-peer
363 Puducherry	173170	2018	4	Peer-to-peer
payments	313822	2019	1	Peer-to-peer
364 Puducherry	331248	2019	2	Peer-to-peer
payments	394866	2019	3	Peer-to-peer
365 Puducherry	559670	2019	4	Peer-to-peer
payments	600290	2020	1	Peer-to-peer
366 Puducherry		2020	2	Peer-to-peer
payments				
367 Puducherry				
payments				
368 Puducherry				
payments				
369 Puducherry				
payments				
370 Puducherry				
payments				
371 Puducherry				
payments				
372 Puducherry				
payments				
373 Puducherry				
payments				

payments	468789			
+-----+-----+-----+-----+-----+				
-----+-----+-----+-----+-----+				
374 Puducherry		2020	3	Peer-to-peer
payments	855511			
+-----+-----+-----+-----+-----+				
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375 Puducherry		2020	4	Peer-to-peer
payments	1211359			
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376 Puducherry		2021	1	Peer-to-peer
payments	1406958			
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377 Puducherry		2021	2	Peer-to-peer
payments	1581221			
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378 Punjab		2018	1	Recharge & bi
ll payments	946338			
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379 Punjab		2018	2	Recharge & bi
ll payments	1262450			
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380 Punjab		2018	3	Peer-to-peer
payments	1684209			
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381 Punjab		2018	4	Peer-to-peer
payments	2269375			
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382 Punjab		2019	1	Peer-to-peer
payments	4026294			
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383 Punjab		2019	2	Peer-to-peer
payments	4140474			
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384 Punjab		2019	3	Peer-to-peer
payments	4726946			
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385 Punjab		2019	4	Peer-to-peer
payments	6386367			
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386 Punjab		2020	1	Peer-to-peer
payments	6339183			
+-----+-----+-----+-----+-----+				
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387 Punjab		2020	2	Recharge & bi
ll payments	6064807			
+-----+-----+-----+-----+-----+				
-----+-----+-----+-----+-----+				
388 Punjab		2020	3	Peer-to-peer

payments	7354451			
389 Punjab	9609405	2020	4	Peer-to-peer
payments	10951083	2021	1	Peer-to-peer
391 Punjab	13180933	2021	2	Peer-to-peer
payments	4305940	2018	1	Recharge & bi
393 Rajasthan	5288093	2018	2	Recharge & bi
payments	7120792	2018	3	Peer-to-peer
395 Rajasthan	10752729	2018	4	Peer-to-peer
payments	27621606	2019	1	Peer-to-peer
397 Rajasthan	25257679	2019	2	Peer-to-peer
payments	29885618	2019	3	Peer-to-peer
399 Rajasthan	43354317	2019	4	Peer-to-peer
payments	48269912	2020	1	Peer-to-peer
401 Rajasthan	49160792	2020	2	Peer-to-peer
payments	73247856	2020	3	Peer-to-peer
403 Rajasthan		2020	4	Peer-to-peer

[illegible]

payments	403703			
+-----+-----+-----+-----+-----+				
419 Sikkim		2021	2	Peer-to-peer
payments	473141			
+-----+-----+-----+-----+-----+				
420 Tamil Nadu		2018	1	Recharge & bi
ll payments	3308548			
+-----+-----+-----+-----+-----+				
421 Tamil Nadu		2018	2	Recharge & bi
ll payments	4464677			
+-----+-----+-----+-----+-----+				
422 Tamil Nadu		2018	3	Peer-to-peer
payments	8810836			
+-----+-----+-----+-----+-----+				
423 Tamil Nadu		2018	4	Peer-to-peer
payments	11538547			
+-----+-----+-----+-----+-----+				
424 Tamil Nadu		2019	1	Peer-to-peer
payments	18645926			
+-----+-----+-----+-----+-----+				
425 Tamil Nadu		2019	2	Peer-to-peer
payments	16952961			
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426 Tamil Nadu		2019	3	Peer-to-peer
payments	21277636			
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427 Tamil Nadu		2019	4	Peer-to-peer
payments	28814008			
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428 Tamil Nadu		2020	1	Peer-to-peer
payments	30880360			
+-----+-----+-----+-----+-----+				
429 Tamil Nadu		2020	2	Peer-to-peer
payments	21700844			
+-----+-----+-----+-----+-----+				
430 Tamil Nadu		2020	3	Peer-to-peer
payments	31754077			
+-----+-----+-----+-----+-----+				
431 Tamil Nadu		2020	4	Peer-to-peer
payments	47800741			
+-----+-----+-----+-----+-----+				
432 Tamil Nadu		2021	1	Peer-to-peer
payments	57446279			
+-----+-----+-----+-----+-----+				
433 Tamil Nadu		2021	2	Peer-to-peer

11 payments	86819			
+-----+-----+-----+-----+-----+				
449 Tripura		2018	2	Recharge & bi
11 payments	118171			
+-----+-----+-----+-----+-----+				
450 Tripura		2018	3	Peer-to-peer
payments	186065			
+-----+-----+-----+-----+-----+				
451 Tripura		2018	4	Recharge & bi
11 payments	204720			
+-----+-----+-----+-----+-----+				
452 Tripura		2019	1	Peer-to-peer
payments	296993			
+-----+-----+-----+-----+-----+				
453 Tripura		2019	2	Peer-to-peer
payments	240776			
+-----+-----+-----+-----+-----+				
454 Tripura		2019	3	Recharge & bi
11 payments	339539			
+-----+-----+-----+-----+-----+				
455 Tripura		2019	4	Recharge & bi
11 payments	373779			
+-----+-----+-----+-----+-----+				
456 Tripura		2020	1	Recharge & bi
11 payments	449584			
+-----+-----+-----+-----+-----+				
457 Tripura		2020	2	Recharge & bi
11 payments	600206			
+-----+-----+-----+-----+-----+				
458 Tripura		2020	3	Recharge & bi
11 payments	627363			
+-----+-----+-----+-----+-----+				
459 Tripura		2020	4	Peer-to-peer
payments	650386			
+-----+-----+-----+-----+-----+				
460 Tripura		2021	1	Peer-to-peer
payments	643366			
+-----+-----+-----+-----+-----+				
461 Tripura		2021	2	Peer-to-peer
payments	703728			
+-----+-----+-----+-----+-----+				
462 Uttar Pradesh		2018	1	Recharge & bi
11 payments	7003704			
+-----+-----+-----+-----+-----+				
463 Uttar Pradesh		2018	2	Recharge & bi

11 payments	9232131				
464	Uttar Pradesh	2018	3	Peer-to-peer	
payments	13828768				
465	Uttar Pradesh	2018	4	Peer-to-peer	
payments	15804910				
466	Uttar Pradesh	2019	1	Peer-to-peer	
payments	32062452				
467	Uttar Pradesh	2019	2	Peer-to-peer	
payments	27105049				
468	Uttar Pradesh	2019	3	Peer-to-peer	
payments	26990786				
469	Uttar Pradesh	2019	4	Peer-to-peer	
payments	40540310				
470	Uttar Pradesh	2020	1	Peer-to-peer	
payments	39581157				
471	Uttar Pradesh	2020	2	Recharge & bi	
11 payments	42229417				
472	Uttar Pradesh	2020	3	Peer-to-peer	
payments	54449911				
473	Uttar Pradesh	2020	4	Peer-to-peer	
payments	75433782				
474	Uttar Pradesh	2021	1	Peer-to-peer	
payments	85539321				
475	Uttar Pradesh	2021	2	Peer-to-peer	
payments	102927942				
476	Uttarakhand	2018	1	Recharge & bi	
11 payments	730428				
477	Uttarakhand	2018	2	Recharge & bi	
11 payments	946332				
478	Uttarakhand	2018	3	Peer-to-peer	

payments	1049725			
+-----+-----+-----+-----+-----				
-----+-----+-----+-----+-----				
479 Uttarakhand		2018	4	Peer-to-peer
payments	1556731			
+-----+-----+-----+-----+-----				
-----+-----+-----+-----+-----				
480 Uttarakhand		2019	1	Peer-to-peer
payments	3499130			
+-----+-----+-----+-----+-----				
-----+-----+-----+-----+-----				
481 Uttarakhand		2019	2	Peer-to-peer
payments	2383662			
+-----+-----+-----+-----+-----				
-----+-----+-----+-----+-----				
482 Uttarakhand		2019	3	Peer-to-peer
payments	2313544			
+-----+-----+-----+-----+-----				
-----+-----+-----+-----+-----				
483 Uttarakhand		2019	4	Peer-to-peer
payments	3210116			
+-----+-----+-----+-----+-----				
-----+-----+-----+-----+-----				
484 Uttarakhand		2020	1	Peer-to-peer
payments	3792776			
+-----+-----+-----+-----+-----				
-----+-----+-----+-----+-----				
485 Uttarakhand		2020	2	Recharge & bi
ll payments	3755695			
+-----+-----+-----+-----+-----				
-----+-----+-----+-----+-----				
486 Uttarakhand		2020	3	Peer-to-peer
payments	4836512			
+-----+-----+-----+-----+-----				
-----+-----+-----+-----+-----				
487 Uttarakhand		2020	4	Peer-to-peer
payments	6748183			
+-----+-----+-----+-----+-----				
-----+-----+-----+-----+-----				
488 Uttarakhand		2021	1	Merchant paym
ents	8393767			
+-----+-----+-----+-----+-----				
-----+-----+-----+-----+-----				
489 Uttarakhand		2021	2	Peer-to-peer
payments	9374939			
+-----+-----+-----+-----+-----				
-----+-----+-----+-----+-----				
490 West Bengal		2018	1	Recharge & bi
ll payments	5773831			
+-----+-----+-----+-----+-----				
-----+-----+-----+-----+-----				
491 West Bengal		2018	2	Peer-to-peer
payments	8284944			
+-----+-----+-----+-----+-----				
-----+-----+-----+-----+-----				
492 West Bengal		2018	3	Peer-to-peer
payments	41882429			
+-----+-----+-----+-----+-----				
-----+-----+-----+-----+-----				
493 West Bengal		2018	4	Peer-to-peer

payments	17154995			
-----+				
-----+				
494 West Bengal		2019	1	Peer-to-peer
payments	27374206			
-----+				
-----+				
495 West Bengal		2019	2	Peer-to-peer
payments	20285958			
-----+				
-----+				
496 West Bengal		2019	3	Merchant paym
ents	30804036			
-----+				
-----+				
497 West Bengal		2019	4	Peer-to-peer
payments	67037576			
-----+				
-----+				
498 West Bengal		2020	1	Peer-to-peer
payments	28457404			
-----+				
-----+				
499 West Bengal		2020	2	Peer-to-peer
payments	24855687			
-----+				
-----+				
500 West Bengal		2020	3	Peer-to-peer
payments	37556349			
-----+				
-----+				
501 West Bengal		2020	4	Peer-to-peer
payments	46437233			
-----+				
-----+				
502 West Bengal		2021	1	Peer-to-peer
payments	53869075			
-----+				
-----+				
503 West Bengal		2021	2	Peer-to-peer
payments	64661051			
-----+				
-----+				

Peer-to-peer payments dominate in most states — especially in UP, Bihar, Maharashtra, and Karnataka. Merchant payments lead in Delhi, Karnataka, Maharashtra — indicating strong commercial activity. Recharge & bill payments are top in smaller or remote regions — like Lakshadweep, Mizoram, Nagaland, etc.

```
In [28]: # Determine the device brand with the highest number of registered users in each state
# Identify the device brand with the highest number of registered users in each state
top_brand_per_state = state_device_data.sort_values(by = "Registered Users", ascending=False)
result = top_brand_per_state[['State', 'Brand', 'Registered Users']]
print("Top Device Brand by Registered Users in Each State")
print(tabulate(result, headers='keys', tablefmt='grid'))
```

Top Device Brand by Registered Users in Each State

	State	Brand	Registered Users
0	Andaman & Nicobar Islands	Vivo	15056
1	Andhra Pradesh	Xiaomi	4937684
2	Arunachal Pradesh	Vivo	63439
3	Assam	Xiaomi	909274
4	Bihar	Xiaomi	4268361
5	Chandigarh	Xiaomi	101761
6	Chhattisgarh	Vivo	1169224
7	Dadra & Nagar Haveli and Daman & Diu	Vivo	87001
8	Delhi	Xiaomi	2731995
9	Goa	Xiaomi	152107
10	Gujarat	Vivo	3834323
11	Haryana	Xiaomi	2505880
12	Himachal Pradesh	Xiaomi	513196
13	Jammu & Kashmir	Xiaomi	446949
14	Jharkhand	Xiaomi	1595475
15	Karnataka	Xiaomi	6567268
16	Kerala	Xiaomi	1714598
17	Ladakh	Xiaomi	21227
18	Lakshadweep	Vivo	1118
19	Madhya Pradesh	Xiaomi	4052668
20	Maharashtra	Xiaomi	9764252
21	Manipur	Xiaomi	159031
22	Meghalaya	Xiaomi	48812
23	Mizoram	Xiaomi	29025
24	Nagaland	Xiaomi	69897
25	Odisha	Xiaomi	2776465
26	Puducherry	Xiaomi	83067
27	Punjab	Xiaomi	1380642

28	Rajasthan	Vivo	4603263
+-----+		+-----+	
29	Sikkim	Samsung	55452
+-----+		+-----+	
30	Tamil Nadu	Xiaomi	4159447
+-----+		+-----+	
31	Telangana	Xiaomi	4736356
+-----+		+-----+	
32	Tripura	Xiaomi	116546
+-----+		+-----+	
33	Uttar Pradesh	Xiaomi	8037309
+-----+		+-----+	
34	Uttarakhand	Xiaomi	681400
+-----+		+-----+	
35	West Bengal	Xiaomi	4654760
+-----+		+-----+	

Xiaomi is the dominant brand in 34 out of 35 states showing its massive reach and affordability

```
In [29]: # Create a list of the top district per state based on population
# 1. For each state, identify the district with the highest population, Display

highest_population_per_state = district_demo.sort_values(by = "Population", asce
highest_population_per_state = highest_population_per_state[["State", "District",

print("District by highest population in Each State")
print(tabulate(highest_population_per_state, headers='keys', tablefmt='grid'))
```


District by highest population in Each State

+-----+-----+-----+-----+			
---+			
	State	District	Populati
on			
+=====+=====+=====+=====			
===+			
0	Andaman & Nicobar Islands	South Andaman	2381
42			
+-----+-----+-----+-----			
---+			
1	Andhra Pradesh	East Godavari	51515
49			
+-----+-----+-----+-----			
---+			
2	Arunachal Pradesh	Papum Pare	1763
85			
+-----+-----+-----+-----			
---+			
3	Assam	Nagaon	28260
06			
+-----+-----+-----+-----			
---+			
4	Bihar	Patna	57728
04			
+-----+-----+-----+-----			
---+			
5	Chandigarh	Chandigarh	10554
50			
+-----+-----+-----+-----			
---+			
6	Chhattisgarh	Raipur	21608
76			
+-----+-----+-----+-----			
---+			
7	Dadra & Nagar Haveli and Daman & Diu	Dadra and Nagar Haveli	3437
09			
+-----+-----+-----+-----			
---+			
8	Delhi	North West Delhi	36565
39			
+-----+-----+-----+-----			
---+			
9	Goa	North Goa	8177
61			
+-----+-----+-----+-----			
---+			
10	Gujarat	Ahmedabad	72082
00			
+-----+-----+-----+-----			
---+			
11	Haryana	Faridabad	17989
54			
+-----+-----+-----+-----			
---+			
12	Himachal Pradesh	Kangra	15072
23			
+-----+-----+-----+-----			
---+			
13	Jammu & Kashmir	Jammu	15264


```
In [31]: # Column Chart of Top Districts by Population
import matplotlib.pyplot as plt

plt.figure(figsize=(14,6))
plt.bar(highest_population_per_state['State'], highest_population_per_state['Pop
plt.xticks(rotation=90)
plt.title('Top District by Population in Each State')
plt.xlabel('State')
plt.ylabel('Population')
plt.tight_layout()
plt.show()
```



```
In [32]: #Calculate the average transaction value (ATV) for each state
# 1. Compute the average transaction value for each state. Display the results i
ATV = state_txn_users.groupby('State')['ATV (INR)'].sum().reset_index()
ATV['ATV (INR)'] = np.round(ATV['ATV (INR)'], 0)
print(" Average Transaction Value (ATV) per State")
print(tabulate(ATV, headers='keys', tablefmt='grid'))
```

Average Transaction Value (ATV) per State

	State	ATV (INR)
0	Andaman & Nicobar Islands	44230
1	Andhra Pradesh	24473
2	Arunachal Pradesh	36937
3	Assam	28119
4	Bihar	28326
5	Chandigarh	29593
6	Chhattisgarh	23111
7	Dadra & Nagar Haveli and Daman & Diu	20824
8	Delhi	22258
9	Goa	26534
10	Gujarat	23745
11	Haryana	25646
12	Himachal Pradesh	25555
13	Jammu & Kashmir	35119
14	Jharkhand	22853
15	Karnataka	21243
16	Kerala	23400
17	Ladakh	47715
18	Lakshadweep	38866
19	Madhya Pradesh	22416
20	Maharashtra	21229
21	Manipur	36697
22	Meghalaya	28788
23	Mizoram	40985
24	Nagaland	36539
25	Odisha	19994
26	Puducherry	26987
27	Punjab	29193

28	Rajasthan		24608
+-----+		+-----+	
29	Sikkim		29230
+-----+		+-----+	
30	Tamil Nadu		26059
+-----+		+-----+	
31	Telangana		25801
+-----+		+-----+	
32	Tripura		21758
+-----+		+-----+	
33	Uttar Pradesh		23231
+-----+		+-----+	
34	Uttarakhand		23417
+-----+		+-----+	
35	West Bengal		19230
+-----+		+-----+	

```
In [33]: # 2. Identify the top 5 states with the highest ATV and the top 5 states with th
ATV = ATV.sort_values(by = "ATV (INR)", ascending= False)
top5_ATV = ATV.head(5)
bottom5_ATV = ATV.tail(5)

print("Top 5 States by ATV")
print(tabulate(top5_ATV, headers='keys', tablefmt='grid'))

print("\n Bottom 5 States by ATV")
print(tabulate(bottom5_ATV, headers='keys', tablefmt='grid'))
```

Top 5 States by ATV

	State		ATV (INR)
+-----+		+-----+	
17	Ladakh		47715
+-----+		+-----+	
0	Andaman & Nicobar Islands		44230
+-----+		+-----+	
23	Mizoram		40985
+-----+		+-----+	
18	Lakshadweep		38866
+-----+		+-----+	
2	Arunachal Pradesh		36937
+-----+		+-----+	

Bottom 5 States by ATV

	State		ATV (INR)
+-----+		+-----+	
15	Karnataka		21243
+-----+		+-----+	
20	Maharashtra		21229
+-----+		+-----+	
7	Dadra & Nagar Haveli and Daman & Diu		20824
+-----+		+-----+	
25	Odisha		19994
+-----+		+-----+	
35	West Bengal		19230
+-----+		+-----+	

```
In [34]: # 2.6. Analyze app usage trends
# 1. Calculate the total number of app opens over the years and quarters for eac
```

```
app_usage_summary = state_txn_users.groupby(["State", "Year", "Quarter"])["App Opens"]  
print("Total App Opens by State, Year & Quarter")  
print(tabulate(app_usage_summary, headers='keys', tablefmt='grid'))
```

Total App Opens by State, Year & Quarter

	State	Year	Quarter	App Opens
0	Andaman & Nicobar Islands	2018	1	0
1	Andaman & Nicobar Islands	2018	2	0
2	Andaman & Nicobar Islands	2018	3	0
3	Andaman & Nicobar Islands	2018	4	0
4	Andaman & Nicobar Islands	2019	1	0
5	Andaman & Nicobar Islands	2019	2	52640
6	Andaman & Nicobar Islands	2019	3	171107
7	Andaman & Nicobar Islands	2019	4	177012
8	Andaman & Nicobar Islands	2020	1	193586
9	Andaman & Nicobar Islands	2020	2	305072
10	Andaman & Nicobar Islands	2020	3	515565
11	Andaman & Nicobar Islands	2020	4	887208
12	Andaman & Nicobar Islands	2021	1	1004336
13	Andaman & Nicobar Islands	2021	2	2248223
14	Andhra Pradesh	2018	1	0
15	Andhra Pradesh	2018	2	0
16	Andhra Pradesh	2018	3	0
17	Andhra Pradesh	2018	4	0
18	Andhra Pradesh	2019	1	0
19	Andhra Pradesh	2019	2	81375251
20	Andhra Pradesh	2019	3	310953542
21	Andhra Pradesh	2019	4	411201518
22	Andhra Pradesh	2020	1	486513773
23	Andhra Pradesh	2020	2	494341698
24	Andhra Pradesh	2020	3	696300382
25	Andhra Pradesh	2020	4	869078538
26	Andhra Pradesh	2021	2	1044705436
27	Arunachal Pradesh	2018	1	0

28	Arunachal Pradesh	2018	2	0
+-----+		+-----+		+-----+
29	Arunachal Pradesh	2018	3	0
+-----+		+-----+		+-----+
30	Arunachal Pradesh	2018	4	0
+-----+		+-----+		+-----+
31	Arunachal Pradesh	2019	1	0
+-----+		+-----+		+-----+
32	Arunachal Pradesh	2019	2	502873
+-----+		+-----+		+-----+
33	Arunachal Pradesh	2019	3	1811700
+-----+		+-----+		+-----+
34	Arunachal Pradesh	2019	4	2140340
+-----+		+-----+		+-----+
35	Arunachal Pradesh	2020	1	2598321
+-----+		+-----+		+-----+
36	Arunachal Pradesh	2020	2	3387006
+-----+		+-----+		+-----+
37	Arunachal Pradesh	2020	3	4003421
+-----+		+-----+		+-----+
38	Arunachal Pradesh	2020	4	4472667
+-----+		+-----+		+-----+
39	Arunachal Pradesh	2021	1	4796708
+-----+		+-----+		+-----+
40	Arunachal Pradesh	2021	2	13025849
+-----+		+-----+		+-----+
41	Assam	2018	1	0
+-----+		+-----+		+-----+
42	Assam	2018	2	0
+-----+		+-----+		+-----+
43	Assam	2018	3	0
+-----+		+-----+		+-----+
44	Assam	2018	4	0
+-----+		+-----+		+-----+
45	Assam	2019	1	0
+-----+		+-----+		+-----+
46	Assam	2019	2	7350326
+-----+		+-----+		+-----+
47	Assam	2019	3	25393673
+-----+		+-----+		+-----+
48	Assam	2019	4	26599449
+-----+		+-----+		+-----+
49	Assam	2020	1	33097892
+-----+		+-----+		+-----+
50	Assam	2020	2	39304924
+-----+		+-----+		+-----+
51	Assam	2020	3	41875278
+-----+		+-----+		+-----+
52	Assam	2020	4	49321814
+-----+		+-----+		+-----+
53	Assam	2021	1	56752364
+-----+		+-----+		+-----+
54	Assam	2021	2	102003890
+-----+		+-----+		+-----+
55	Bihar	2018	1	0
+-----+		+-----+		+-----+
56	Bihar	2018	2	0
+-----+		+-----+		+-----+
57	Bihar	2018	3	0
+-----+		+-----+		+-----+

58 Bihar	2018	4	0
+-----+	+-----+	+-----+	+-----+
59 Bihar	2019	1	0
+-----+	+-----+	+-----+	+-----+
60 Bihar	2019	2	39607022
+-----+	+-----+	+-----+	+-----+
61 Bihar	2019	3	126521298
+-----+	+-----+	+-----+	+-----+
62 Bihar	2019	4	163998097
+-----+	+-----+	+-----+	+-----+
63 Bihar	2020	1	183868505
+-----+	+-----+	+-----+	+-----+
64 Bihar	2020	2	218435035
+-----+	+-----+	+-----+	+-----+
65 Bihar	2020	3	266652644
+-----+	+-----+	+-----+	+-----+
66 Bihar	2020	4	317056600
+-----+	+-----+	+-----+	+-----+
67 Bihar	2021	1	355792608
+-----+	+-----+	+-----+	+-----+
68 Bihar	2021	2	371198660
+-----+	+-----+	+-----+	+-----+
69 Chandigarh	2018	1	0
+-----+	+-----+	+-----+	+-----+
70 Chandigarh	2018	2	0
+-----+	+-----+	+-----+	+-----+
71 Chandigarh	2018	3	0
+-----+	+-----+	+-----+	+-----+
72 Chandigarh	2018	4	0
+-----+	+-----+	+-----+	+-----+
73 Chandigarh	2019	1	0
+-----+	+-----+	+-----+	+-----+
74 Chandigarh	2019	2	1220176
+-----+	+-----+	+-----+	+-----+
75 Chandigarh	2019	3	4625196
+-----+	+-----+	+-----+	+-----+
76 Chandigarh	2019	4	4960441
+-----+	+-----+	+-----+	+-----+
77 Chandigarh	2020	1	5201211
+-----+	+-----+	+-----+	+-----+
78 Chandigarh	2020	2	3451250
+-----+	+-----+	+-----+	+-----+
79 Chandigarh	2020	3	4888739
+-----+	+-----+	+-----+	+-----+
80 Chandigarh	2020	4	6477974
+-----+	+-----+	+-----+	+-----+
81 Chandigarh	2021	1	7919533
+-----+	+-----+	+-----+	+-----+
82 Chandigarh	2021	2	4733924
+-----+	+-----+	+-----+	+-----+
83 Chhattisgarh	2018	1	0
+-----+	+-----+	+-----+	+-----+
84 Chhattisgarh	2018	2	0
+-----+	+-----+	+-----+	+-----+
85 Chhattisgarh	2018	3	0
+-----+	+-----+	+-----+	+-----+
86 Chhattisgarh	2018	4	0
+-----+	+-----+	+-----+	+-----+
87 Chhattisgarh	2019	1	0
+-----+	+-----+	+-----+	+-----+

88 Chhattisgarh	2019	2	13206373
+-----+	+-----+	+-----+	+-----+
89 Chhattisgarh	2019	3	46362341
+-----+	+-----+	+-----+	+-----+
90 Chhattisgarh	2019	4	57278977
+-----+	+-----+	+-----+	+-----+
91 Chhattisgarh	2020	1	64224101
+-----+	+-----+	+-----+	+-----+
92 Chhattisgarh	2020	2	68493384
+-----+	+-----+	+-----+	+-----+
93 Chhattisgarh	2020	3	86918606
+-----+	+-----+	+-----+	+-----+
94 Chhattisgarh	2020	4	109900467
+-----+	+-----+	+-----+	+-----+
95 Chhattisgarh	2021	1	124648704
+-----+	+-----+	+-----+	+-----+
96 Chhattisgarh	2021	2	205784717
+-----+	+-----+	+-----+	+-----+
97 Dadra & Nagar Haveli and Daman & Diu	2018	1	0
+-----+	+-----+	+-----+	+-----+
98 Dadra & Nagar Haveli and Daman & Diu	2018	2	0
+-----+	+-----+	+-----+	+-----+
99 Dadra & Nagar Haveli and Daman & Diu	2018	3	0
+-----+	+-----+	+-----+	+-----+
100 Dadra & Nagar Haveli and Daman & Diu	2018	4	0
+-----+	+-----+	+-----+	+-----+
101 Dadra & Nagar Haveli and Daman & Diu	2019	1	0
+-----+	+-----+	+-----+	+-----+
102 Dadra & Nagar Haveli and Daman & Diu	2019	2	860686
+-----+	+-----+	+-----+	+-----+
103 Dadra & Nagar Haveli and Daman & Diu	2019	3	3126189
+-----+	+-----+	+-----+	+-----+
104 Dadra & Nagar Haveli and Daman & Diu	2019	4	3770543
+-----+	+-----+	+-----+	+-----+
105 Dadra & Nagar Haveli and Daman & Diu	2020	1	4195122
+-----+	+-----+	+-----+	+-----+
106 Dadra & Nagar Haveli and Daman & Diu	2020	2	4505127
+-----+	+-----+	+-----+	+-----+
107 Dadra & Nagar Haveli and Daman & Diu	2020	3	4421499
+-----+	+-----+	+-----+	+-----+
108 Dadra & Nagar Haveli and Daman & Diu	2020	4	6196436
+-----+	+-----+	+-----+	+-----+
109 Dadra & Nagar Haveli and Daman & Diu	2021	1	7302462
+-----+	+-----+	+-----+	+-----+
110 Dadra & Nagar Haveli and Daman & Diu	2021	2	5062983
+-----+	+-----+	+-----+	+-----+
111 Delhi	2018	1	0
+-----+	+-----+	+-----+	+-----+
112 Delhi	2018	2	0
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113 Delhi	2018	3	0
+-----+	+-----+	+-----+	+-----+
114 Delhi	2018	4	0
+-----+	+-----+	+-----+	+-----+
115 Delhi	2019	1	0
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116 Delhi	2019	2	43731570
+-----+	+-----+	+-----+	+-----+
117 Delhi	2019	3	163381027
+-----+	+-----+	+-----+	+-----+

118 Delhi	2019	4	172682671
+-----+	+-----+	+-----+	+-----+
119 Delhi	2020	1	178263986
+-----+	+-----+	+-----+	+-----+
120 Delhi	2020	2	142852253
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121 Delhi	2020	3	190025029
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122 Delhi	2020	4	243433752
+-----+	+-----+	+-----+	+-----+
123 Delhi	2021	1	281201600
+-----+	+-----+	+-----+	+-----+
124 Delhi	2021	2	164997774
+-----+	+-----+	+-----+	+-----+
125 Goa	2018	1	0
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126 Goa	2018	2	0
+-----+	+-----+	+-----+	+-----+
127 Goa	2018	3	0
+-----+	+-----+	+-----+	+-----+
128 Goa	2018	4	0
+-----+	+-----+	+-----+	+-----+
129 Goa	2019	1	0
+-----+	+-----+	+-----+	+-----+
130 Goa	2019	2	1352232
+-----+	+-----+	+-----+	+-----+
131 Goa	2019	3	4753892
+-----+	+-----+	+-----+	+-----+
132 Goa	2019	4	6290543
+-----+	+-----+	+-----+	+-----+
133 Goa	2020	1	7147233
+-----+	+-----+	+-----+	+-----+
134 Goa	2020	2	5310126
+-----+	+-----+	+-----+	+-----+
135 Goa	2020	3	6129766
+-----+	+-----+	+-----+	+-----+
136 Goa	2020	4	10991118
+-----+	+-----+	+-----+	+-----+
137 Goa	2021	1	15467672
+-----+	+-----+	+-----+	+-----+
138 Goa	2021	2	12710361
+-----+	+-----+	+-----+	+-----+
139 Gujarat	2018	1	0
+-----+	+-----+	+-----+	+-----+
140 Gujarat	2018	2	0
+-----+	+-----+	+-----+	+-----+
141 Gujarat	2018	3	0
+-----+	+-----+	+-----+	+-----+
142 Gujarat	2018	4	0
+-----+	+-----+	+-----+	+-----+
143 Gujarat	2019	1	0
+-----+	+-----+	+-----+	+-----+
144 Gujarat	2019	2	34890301
+-----+	+-----+	+-----+	+-----+
145 Gujarat	2019	3	129441484
+-----+	+-----+	+-----+	+-----+
146 Gujarat	2019	4	147973757
+-----+	+-----+	+-----+	+-----+
147 Gujarat	2020	1	165605122
+-----+	+-----+	+-----+	+-----+

148 Gujarat	2020	2	155264359
+-----+	+-----+	+-----+	+-----+
149 Gujarat	2020	3	184402472
+-----+	+-----+	+-----+	+-----+
150 Gujarat	2020	4	230497353
+-----+	+-----+	+-----+	+-----+
151 Gujarat	2021	1	264732874
+-----+	+-----+	+-----+	+-----+
152 Gujarat	2021	2	282432543
+-----+	+-----+	+-----+	+-----+
153 Haryana	2018	1	0
+-----+	+-----+	+-----+	+-----+
154 Haryana	2018	2	0
+-----+	+-----+	+-----+	+-----+
155 Haryana	2018	3	0
+-----+	+-----+	+-----+	+-----+
156 Haryana	2018	4	0
+-----+	+-----+	+-----+	+-----+
157 Haryana	2019	1	0
+-----+	+-----+	+-----+	+-----+
158 Haryana	2019	2	31929195
+-----+	+-----+	+-----+	+-----+
159 Haryana	2019	3	118332587
+-----+	+-----+	+-----+	+-----+
160 Haryana	2019	4	136721888
+-----+	+-----+	+-----+	+-----+
161 Haryana	2020	1	157793468
+-----+	+-----+	+-----+	+-----+
162 Haryana	2020	2	143650123
+-----+	+-----+	+-----+	+-----+
163 Haryana	2020	3	188614769
+-----+	+-----+	+-----+	+-----+
164 Haryana	2020	4	236101307
+-----+	+-----+	+-----+	+-----+
165 Haryana	2021	1	266686683
+-----+	+-----+	+-----+	+-----+
166 Haryana	2021	2	234052506
+-----+	+-----+	+-----+	+-----+
167 Himachal Pradesh	2018	1	0
+-----+	+-----+	+-----+	+-----+
168 Himachal Pradesh	2018	2	0
+-----+	+-----+	+-----+	+-----+
169 Himachal Pradesh	2018	3	0
+-----+	+-----+	+-----+	+-----+
170 Himachal Pradesh	2018	4	0
+-----+	+-----+	+-----+	+-----+
171 Himachal Pradesh	2019	1	0
+-----+	+-----+	+-----+	+-----+
172 Himachal Pradesh	2019	2	3321711
+-----+	+-----+	+-----+	+-----+
173 Himachal Pradesh	2019	3	10720741
+-----+	+-----+	+-----+	+-----+
174 Himachal Pradesh	2019	4	12637904
+-----+	+-----+	+-----+	+-----+
175 Himachal Pradesh	2020	1	14640104
+-----+	+-----+	+-----+	+-----+
176 Himachal Pradesh	2020	2	16125580
+-----+	+-----+	+-----+	+-----+
177 Himachal Pradesh	2020	3	18411750
+-----+	+-----+	+-----+	+-----+

178 Himachal Pradesh	2020	4	22001148
+-----+	+-----+	+-----+	+-----+
179 Himachal Pradesh	2021	1	24228094
+-----+	+-----+	+-----+	+-----+
180 Himachal Pradesh	2021	2	43269977
+-----+	+-----+	+-----+	+-----+
181 Jammu & Kashmir	2018	1	0
+-----+	+-----+	+-----+	+-----+
182 Jammu & Kashmir	2018	2	0
+-----+	+-----+	+-----+	+-----+
183 Jammu & Kashmir	2018	3	0
+-----+	+-----+	+-----+	+-----+
184 Jammu & Kashmir	2018	4	0
+-----+	+-----+	+-----+	+-----+
185 Jammu & Kashmir	2019	1	0
+-----+	+-----+	+-----+	+-----+
186 Jammu & Kashmir	2019	2	2705373
+-----+	+-----+	+-----+	+-----+
187 Jammu & Kashmir	2019	3	3843919
+-----+	+-----+	+-----+	+-----+
188 Jammu & Kashmir	2019	4	998572
+-----+	+-----+	+-----+	+-----+
189 Jammu & Kashmir	2020	1	4476894
+-----+	+-----+	+-----+	+-----+
190 Jammu & Kashmir	2020	2	9856653
+-----+	+-----+	+-----+	+-----+
191 Jammu & Kashmir	2020	3	11443454
+-----+	+-----+	+-----+	+-----+
192 Jammu & Kashmir	2020	4	16018751
+-----+	+-----+	+-----+	+-----+
193 Jammu & Kashmir	2021	1	18834009
+-----+	+-----+	+-----+	+-----+
194 Jammu & Kashmir	2021	2	34274559
+-----+	+-----+	+-----+	+-----+
195 Jharkhand	2018	1	0
+-----+	+-----+	+-----+	+-----+
196 Jharkhand	2018	2	0
+-----+	+-----+	+-----+	+-----+
197 Jharkhand	2018	3	0
+-----+	+-----+	+-----+	+-----+
198 Jharkhand	2018	4	0
+-----+	+-----+	+-----+	+-----+
199 Jharkhand	2019	1	0
+-----+	+-----+	+-----+	+-----+
200 Jharkhand	2019	2	14929066
+-----+	+-----+	+-----+	+-----+
201 Jharkhand	2019	3	55504460
+-----+	+-----+	+-----+	+-----+
202 Jharkhand	2019	4	70181789
+-----+	+-----+	+-----+	+-----+
203 Jharkhand	2020	1	74014713
+-----+	+-----+	+-----+	+-----+
204 Jharkhand	2020	2	76339276
+-----+	+-----+	+-----+	+-----+
205 Jharkhand	2020	3	99318784
+-----+	+-----+	+-----+	+-----+
206 Jharkhand	2020	4	126310835
+-----+	+-----+	+-----+	+-----+
207 Jharkhand	2021	1	141731331
+-----+	+-----+	+-----+	+-----+

208 Jharkhand	2021	2	184234107
+-----+	+-----+	+-----+	+-----+
209 Karnataka	2018	1	0
+-----+	+-----+	+-----+	+-----+
210 Karnataka	2018	2	0
+-----+	+-----+	+-----+	+-----+
211 Karnataka	2018	3	0
+-----+	+-----+	+-----+	+-----+
212 Karnataka	2018	4	0
+-----+	+-----+	+-----+	+-----+
213 Karnataka	2019	1	0
+-----+	+-----+	+-----+	+-----+
214 Karnataka	2019	2	113024811
+-----+	+-----+	+-----+	+-----+
215 Karnataka	2019	3	445683660
+-----+	+-----+	+-----+	+-----+
216 Karnataka	2019	4	569674870
+-----+	+-----+	+-----+	+-----+
217 Karnataka	2020	1	626488036
+-----+	+-----+	+-----+	+-----+
218 Karnataka	2020	2	490510075
+-----+	+-----+	+-----+	+-----+
219 Karnataka	2020	3	693683212
+-----+	+-----+	+-----+	+-----+
220 Karnataka	2020	4	935510690
+-----+	+-----+	+-----+	+-----+
221 Karnataka	2021	1	1084917385
+-----+	+-----+	+-----+	+-----+
222 Karnataka	2021	2	1051089714
+-----+	+-----+	+-----+	+-----+
223 Kerala	2018	1	0
+-----+	+-----+	+-----+	+-----+
224 Kerala	2018	2	0
+-----+	+-----+	+-----+	+-----+
225 Kerala	2018	3	0
+-----+	+-----+	+-----+	+-----+
226 Kerala	2018	4	0
+-----+	+-----+	+-----+	+-----+
227 Kerala	2019	1	0
+-----+	+-----+	+-----+	+-----+
228 Kerala	2019	2	8673220
+-----+	+-----+	+-----+	+-----+
229 Kerala	2019	3	31471694
+-----+	+-----+	+-----+	+-----+
230 Kerala	2019	4	40046033
+-----+	+-----+	+-----+	+-----+
231 Kerala	2020	1	46396398
+-----+	+-----+	+-----+	+-----+
232 Kerala	2020	2	45832953
+-----+	+-----+	+-----+	+-----+
233 Kerala	2020	3	64309022
+-----+	+-----+	+-----+	+-----+
234 Kerala	2020	4	91415273
+-----+	+-----+	+-----+	+-----+
235 Kerala	2021	1	108918733
+-----+	+-----+	+-----+	+-----+
236 Kerala	2021	2	87814415
+-----+	+-----+	+-----+	+-----+
237 Ladakh	2018	1	0
+-----+	+-----+	+-----+	+-----+

238	Ladakh	2018	2	0
+-----+		+-----+		+-----+
239	Ladakh	2018	3	0
+-----+		+-----+		+-----+
240	Ladakh	2018	4	0
+-----+		+-----+		+-----+
241	Ladakh	2019	1	0
+-----+		+-----+		+-----+
242	Ladakh	2019	2	157317
+-----+		+-----+		+-----+
243	Ladakh	2019	3	503126
+-----+		+-----+		+-----+
244	Ladakh	2019	4	470440
+-----+		+-----+		+-----+
245	Ladakh	2020	1	590484
+-----+		+-----+		+-----+
246	Ladakh	2020	2	695673
+-----+		+-----+		+-----+
247	Ladakh	2020	3	1015680
+-----+		+-----+		+-----+
248	Ladakh	2020	4	1232757
+-----+		+-----+		+-----+
249	Ladakh	2021	1	1184204
+-----+		+-----+		+-----+
250	Ladakh	2021	2	4391632
+-----+		+-----+		+-----+
251	Lakshadweep	2018	1	0
+-----+		+-----+		+-----+
252	Lakshadweep	2018	2	0
+-----+		+-----+		+-----+
253	Lakshadweep	2018	3	0
+-----+		+-----+		+-----+
254	Lakshadweep	2018	4	0
+-----+		+-----+		+-----+
255	Lakshadweep	2019	1	0
+-----+		+-----+		+-----+
256	Lakshadweep	2019	2	4580
+-----+		+-----+		+-----+
257	Lakshadweep	2019	3	15038
+-----+		+-----+		+-----+
258	Lakshadweep	2019	4	17760
+-----+		+-----+		+-----+
259	Lakshadweep	2020	1	21982
+-----+		+-----+		+-----+
260	Lakshadweep	2020	2	29202
+-----+		+-----+		+-----+
261	Lakshadweep	2020	3	32128
+-----+		+-----+		+-----+
262	Lakshadweep	2020	4	41144
+-----+		+-----+		+-----+
263	Lakshadweep	2021	1	47283
+-----+		+-----+		+-----+
264	Lakshadweep	2021	2	40301
+-----+		+-----+		+-----+
265	Madhya Pradesh	2018	1	0
+-----+		+-----+		+-----+
266	Madhya Pradesh	2018	2	0
+-----+		+-----+		+-----+
267	Madhya Pradesh	2018	3	0
+-----+		+-----+		+-----+

268	Madhya Pradesh	2018	4	0
+-----+		+-----+		+-----+
269	Madhya Pradesh	2019	1	0
+-----+		+-----+		+-----+
270	Madhya Pradesh	2019	2	50642151
+-----+		+-----+		+-----+
271	Madhya Pradesh	2019	3	192353380
+-----+		+-----+		+-----+
272	Madhya Pradesh	2019	4	237844976
+-----+		+-----+		+-----+
273	Madhya Pradesh	2020	1	262452480
+-----+		+-----+		+-----+
274	Madhya Pradesh	2020	2	253770044
+-----+		+-----+		+-----+
275	Madhya Pradesh	2020	3	324850994
+-----+		+-----+		+-----+
276	Madhya Pradesh	2020	4	405571446
+-----+		+-----+		+-----+
277	Madhya Pradesh	2021	1	482500276
+-----+		+-----+		+-----+
278	Madhya Pradesh	2021	2	727741649
+-----+		+-----+		+-----+
279	Maharashtra	2018	1	0
+-----+		+-----+		+-----+
280	Maharashtra	2018	2	0
+-----+		+-----+		+-----+
281	Maharashtra	2018	3	0
+-----+		+-----+		+-----+
282	Maharashtra	2018	4	0
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283	Maharashtra	2019	1	0
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284	Maharashtra	2019	2	109967705
+-----+		+-----+		+-----+
285	Maharashtra	2019	3	439998413
+-----+		+-----+		+-----+
286	Maharashtra	2019	4	543654112
+-----+		+-----+		+-----+
287	Maharashtra	2020	1	615146568
+-----+		+-----+		+-----+
288	Maharashtra	2020	2	506354812
+-----+		+-----+		+-----+
289	Maharashtra	2020	3	668197101
+-----+		+-----+		+-----+
290	Maharashtra	2020	4	952006770
+-----+		+-----+		+-----+
291	Maharashtra	2021	1	1101976484
+-----+		+-----+		+-----+
292	Maharashtra	2021	2	1208083592
+-----+		+-----+		+-----+
293	Manipur	2018	1	0
+-----+		+-----+		+-----+
294	Manipur	2018	2	0
+-----+		+-----+		+-----+
295	Manipur	2018	3	0
+-----+		+-----+		+-----+
296	Manipur	2018	4	0
+-----+		+-----+		+-----+
297	Manipur	2019	1	0
+-----+		+-----+		+-----+

298 Manipur	2019	2	464829
+-----+	+-----+	+-----+	+-----+
299 Manipur	2019	3	1594205
+-----+	+-----+	+-----+	+-----+
300 Manipur	2019	4	1855488
+-----+	+-----+	+-----+	+-----+
301 Manipur	2020	1	2175642
+-----+	+-----+	+-----+	+-----+
302 Manipur	2020	2	3011491
+-----+	+-----+	+-----+	+-----+
303 Manipur	2020	3	3552375
+-----+	+-----+	+-----+	+-----+
304 Manipur	2020	4	3783432
+-----+	+-----+	+-----+	+-----+
305 Manipur	2021	1	3709227
+-----+	+-----+	+-----+	+-----+
306 Manipur	2021	2	7269002
+-----+	+-----+	+-----+	+-----+
307 Meghalaya	2018	1	0
+-----+	+-----+	+-----+	+-----+
308 Meghalaya	2018	2	0
+-----+	+-----+	+-----+	+-----+
309 Meghalaya	2018	3	0
+-----+	+-----+	+-----+	+-----+
310 Meghalaya	2018	4	0
+-----+	+-----+	+-----+	+-----+
311 Meghalaya	2019	1	0
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312 Meghalaya	2019	2	395764
+-----+	+-----+	+-----+	+-----+
313 Meghalaya	2019	3	1387814
+-----+	+-----+	+-----+	+-----+
314 Meghalaya	2019	4	1490542
+-----+	+-----+	+-----+	+-----+
315 Meghalaya	2020	1	1716211
+-----+	+-----+	+-----+	+-----+
316 Meghalaya	2020	2	2205253
+-----+	+-----+	+-----+	+-----+
317 Meghalaya	2020	3	2384534
+-----+	+-----+	+-----+	+-----+
318 Meghalaya	2020	4	2745917
+-----+	+-----+	+-----+	+-----+
319 Meghalaya	2021	1	2939026
+-----+	+-----+	+-----+	+-----+
320 Meghalaya	2021	2	7290804
+-----+	+-----+	+-----+	+-----+
321 Mizoram	2018	1	0
+-----+	+-----+	+-----+	+-----+
322 Mizoram	2018	2	0
+-----+	+-----+	+-----+	+-----+
323 Mizoram	2018	3	0
+-----+	+-----+	+-----+	+-----+
324 Mizoram	2018	4	0
+-----+	+-----+	+-----+	+-----+
325 Mizoram	2019	1	0
+-----+	+-----+	+-----+	+-----+
326 Mizoram	2019	2	133025
+-----+	+-----+	+-----+	+-----+
327 Mizoram	2019	3	457834
+-----+	+-----+	+-----+	+-----+

328 Mizoram	2019	4	529168
+-----+	+-----+	+-----+	+-----+
329 Mizoram	2020	1	644683
+-----+	+-----+	+-----+	+-----+
330 Mizoram	2020	2	739308
+-----+	+-----+	+-----+	+-----+
331 Mizoram	2020	3	924865
+-----+	+-----+	+-----+	+-----+
332 Mizoram	2020	4	1096182
+-----+	+-----+	+-----+	+-----+
333 Mizoram	2021	1	1193214
+-----+	+-----+	+-----+	+-----+
334 Mizoram	2021	2	4014597
+-----+	+-----+	+-----+	+-----+
335 Nagaland	2018	1	0
+-----+	+-----+	+-----+	+-----+
336 Nagaland	2018	2	0
+-----+	+-----+	+-----+	+-----+
337 Nagaland	2018	3	0
+-----+	+-----+	+-----+	+-----+
338 Nagaland	2018	4	0
+-----+	+-----+	+-----+	+-----+
339 Nagaland	2019	1	0
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340 Nagaland	2019	2	362497
+-----+	+-----+	+-----+	+-----+
341 Nagaland	2019	3	1244022
+-----+	+-----+	+-----+	+-----+
342 Nagaland	2019	4	1454551
+-----+	+-----+	+-----+	+-----+
343 Nagaland	2020	1	1684520
+-----+	+-----+	+-----+	+-----+
344 Nagaland	2020	2	2119279
+-----+	+-----+	+-----+	+-----+
345 Nagaland	2020	3	2868642
+-----+	+-----+	+-----+	+-----+
346 Nagaland	2020	4	2922121
+-----+	+-----+	+-----+	+-----+
347 Nagaland	2021	1	2980581
+-----+	+-----+	+-----+	+-----+
348 Nagaland	2021	2	6716892
+-----+	+-----+	+-----+	+-----+
349 Odisha	2018	1	0
+-----+	+-----+	+-----+	+-----+
350 Odisha	2018	2	0
+-----+	+-----+	+-----+	+-----+
351 Odisha	2018	3	0
+-----+	+-----+	+-----+	+-----+
352 Odisha	2018	4	0
+-----+	+-----+	+-----+	+-----+
353 Odisha	2019	1	0
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354 Odisha	2019	2	33955545
+-----+	+-----+	+-----+	+-----+
355 Odisha	2019	3	130181456
+-----+	+-----+	+-----+	+-----+
356 Odisha	2019	4	189905719
+-----+	+-----+	+-----+	+-----+
357 Odisha	2020	1	175918622
+-----+	+-----+	+-----+	+-----+

358 Odisha	2020	2	154682772
+-----+	+-----+	+-----+	+-----+
359 Odisha	2020	3	205597666
+-----+	+-----+	+-----+	+-----+
360 Odisha	2020	4	270085293
+-----+	+-----+	+-----+	+-----+
361 Odisha	2021	1	301315474
+-----+	+-----+	+-----+	+-----+
362 Odisha	2021	2	367576494
+-----+	+-----+	+-----+	+-----+
363 Puducherry	2018	1	0
+-----+	+-----+	+-----+	+-----+
364 Puducherry	2018	2	0
+-----+	+-----+	+-----+	+-----+
365 Puducherry	2018	3	0
+-----+	+-----+	+-----+	+-----+
366 Puducherry	2018	4	0
+-----+	+-----+	+-----+	+-----+
367 Puducherry	2019	1	0
+-----+	+-----+	+-----+	+-----+
368 Puducherry	2019	2	661932
+-----+	+-----+	+-----+	+-----+
369 Puducherry	2019	3	2476922
+-----+	+-----+	+-----+	+-----+
370 Puducherry	2019	4	3263122
+-----+	+-----+	+-----+	+-----+
371 Puducherry	2020	1	3820943
+-----+	+-----+	+-----+	+-----+
372 Puducherry	2020	2	3057608
+-----+	+-----+	+-----+	+-----+
373 Puducherry	2020	3	4222159
+-----+	+-----+	+-----+	+-----+
374 Puducherry	2020	4	6377136
+-----+	+-----+	+-----+	+-----+
375 Puducherry	2021	1	7914507
+-----+	+-----+	+-----+	+-----+
376 Puducherry	2021	2	5178916
+-----+	+-----+	+-----+	+-----+
377 Punjab	2018	1	0
+-----+	+-----+	+-----+	+-----+
378 Punjab	2018	2	0
+-----+	+-----+	+-----+	+-----+
379 Punjab	2018	3	0
+-----+	+-----+	+-----+	+-----+
380 Punjab	2018	4	0
+-----+	+-----+	+-----+	+-----+
381 Punjab	2019	1	0
+-----+	+-----+	+-----+	+-----+
382 Punjab	2019	2	10928094
+-----+	+-----+	+-----+	+-----+
383 Punjab	2019	3	40860886
+-----+	+-----+	+-----+	+-----+
384 Punjab	2019	4	47673880
+-----+	+-----+	+-----+	+-----+
385 Punjab	2020	1	53853710
+-----+	+-----+	+-----+	+-----+
386 Punjab	2020	2	51289576
+-----+	+-----+	+-----+	+-----+
387 Punjab	2020	3	58946732
+-----+	+-----+	+-----+	+-----+

388 Punjab	2020	4	71191183
+-----+	+-----+	+-----+	+-----+
389 Punjab	2021	1	81052268
+-----+	+-----+	+-----+	+-----+
390 Punjab	2021	2	85894089
+-----+	+-----+	+-----+	+-----+
391 Rajasthan	2018	1	0
+-----+	+-----+	+-----+	+-----+
392 Rajasthan	2018	2	0
+-----+	+-----+	+-----+	+-----+
393 Rajasthan	2018	3	0
+-----+	+-----+	+-----+	+-----+
394 Rajasthan	2018	4	0
+-----+	+-----+	+-----+	+-----+
395 Rajasthan	2019	1	0
+-----+	+-----+	+-----+	+-----+
396 Rajasthan	2019	2	62787336
+-----+	+-----+	+-----+	+-----+
397 Rajasthan	2019	3	238338999
+-----+	+-----+	+-----+	+-----+
398 Rajasthan	2019	4	288904693
+-----+	+-----+	+-----+	+-----+
399 Rajasthan	2020	1	341815756
+-----+	+-----+	+-----+	+-----+
400 Rajasthan	2020	2	329941181
+-----+	+-----+	+-----+	+-----+
401 Rajasthan	2020	3	436682870
+-----+	+-----+	+-----+	+-----+
402 Rajasthan	2020	4	511015109
+-----+	+-----+	+-----+	+-----+
403 Rajasthan	2021	1	632535059
+-----+	+-----+	+-----+	+-----+
404 Rajasthan	2021	2	1072091232
+-----+	+-----+	+-----+	+-----+
405 Sikkim	2018	1	0
+-----+	+-----+	+-----+	+-----+
406 Sikkim	2018	2	0
+-----+	+-----+	+-----+	+-----+
407 Sikkim	2018	3	0
+-----+	+-----+	+-----+	+-----+
408 Sikkim	2018	4	0
+-----+	+-----+	+-----+	+-----+
409 Sikkim	2019	1	0
+-----+	+-----+	+-----+	+-----+
410 Sikkim	2019	2	398520
+-----+	+-----+	+-----+	+-----+
411 Sikkim	2019	3	1316804
+-----+	+-----+	+-----+	+-----+
412 Sikkim	2019	4	1552004
+-----+	+-----+	+-----+	+-----+
413 Sikkim	2020	1	1697163
+-----+	+-----+	+-----+	+-----+
414 Sikkim	2020	2	1912335
+-----+	+-----+	+-----+	+-----+
415 Sikkim	2020	3	2156470
+-----+	+-----+	+-----+	+-----+
416 Sikkim	2020	4	2478670
+-----+	+-----+	+-----+	+-----+
417 Sikkim	2021	1	2795331
+-----+	+-----+	+-----+	+-----+

418 Sikkim	2021	2	4541121
+-----+	+-----+	+-----+	+-----+
419 Tamil Nadu	2018	1	0
+-----+	+-----+	+-----+	+-----+
420 Tamil Nadu	2018	2	0
+-----+	+-----+	+-----+	+-----+
421 Tamil Nadu	2018	3	0
+-----+	+-----+	+-----+	+-----+
422 Tamil Nadu	2018	4	0
+-----+	+-----+	+-----+	+-----+
423 Tamil Nadu	2019	1	0
+-----+	+-----+	+-----+	+-----+
424 Tamil Nadu	2019	2	33658961
+-----+	+-----+	+-----+	+-----+
425 Tamil Nadu	2019	3	124690342
+-----+	+-----+	+-----+	+-----+
426 Tamil Nadu	2019	4	155011717
+-----+	+-----+	+-----+	+-----+
427 Tamil Nadu	2020	1	179908753
+-----+	+-----+	+-----+	+-----+
428 Tamil Nadu	2020	2	144907447
+-----+	+-----+	+-----+	+-----+
429 Tamil Nadu	2020	3	194683284
+-----+	+-----+	+-----+	+-----+
430 Tamil Nadu	2020	4	288233552
+-----+	+-----+	+-----+	+-----+
431 Tamil Nadu	2021	1	348801714
+-----+	+-----+	+-----+	+-----+
432 Tamil Nadu	2021	2	343968474
+-----+	+-----+	+-----+	+-----+
433 Telangana	2018	1	0
+-----+	+-----+	+-----+	+-----+
434 Telangana	2018	2	0
+-----+	+-----+	+-----+	+-----+
435 Telangana	2018	3	0
+-----+	+-----+	+-----+	+-----+
436 Telangana	2018	4	0
+-----+	+-----+	+-----+	+-----+
437 Telangana	2019	1	0
+-----+	+-----+	+-----+	+-----+
438 Telangana	2019	2	80842302
+-----+	+-----+	+-----+	+-----+
439 Telangana	2019	3	318124511
+-----+	+-----+	+-----+	+-----+
440 Telangana	2019	4	399239044
+-----+	+-----+	+-----+	+-----+
441 Telangana	2020	1	454723816
+-----+	+-----+	+-----+	+-----+
442 Telangana	2020	2	367130505
+-----+	+-----+	+-----+	+-----+
443 Telangana	2020	3	527781925
+-----+	+-----+	+-----+	+-----+
444 Telangana	2020	4	764614235
+-----+	+-----+	+-----+	+-----+
445 Telangana	2021	1	920040042
+-----+	+-----+	+-----+	+-----+
446 Telangana	2021	2	905317692
+-----+	+-----+	+-----+	+-----+
447 Tripura	2018	1	0
+-----+	+-----+	+-----+	+-----+

448 Tripura	2018	2	0
+-----+	+-----+	+-----+	+-----+
449 Tripura	2018	3	0
+-----+	+-----+	+-----+	+-----+
450 Tripura	2018	4	0
+-----+	+-----+	+-----+	+-----+
451 Tripura	2019	1	0
+-----+	+-----+	+-----+	+-----+
452 Tripura	2019	2	953627
+-----+	+-----+	+-----+	+-----+
453 Tripura	2019	3	3350991
+-----+	+-----+	+-----+	+-----+
454 Tripura	2019	4	3610807
+-----+	+-----+	+-----+	+-----+
455 Tripura	2020	1	4063223
+-----+	+-----+	+-----+	+-----+
456 Tripura	2020	2	4443221
+-----+	+-----+	+-----+	+-----+
457 Tripura	2020	3	5777908
+-----+	+-----+	+-----+	+-----+
458 Tripura	2020	4	6017249
+-----+	+-----+	+-----+	+-----+
459 Tripura	2021	1	6009660
+-----+	+-----+	+-----+	+-----+
460 Tripura	2021	2	9500881
+-----+	+-----+	+-----+	+-----+
461 Uttar Pradesh	2018	1	0
+-----+	+-----+	+-----+	+-----+
462 Uttar Pradesh	2018	2	0
+-----+	+-----+	+-----+	+-----+
463 Uttar Pradesh	2018	3	0
+-----+	+-----+	+-----+	+-----+
464 Uttar Pradesh	2018	4	0
+-----+	+-----+	+-----+	+-----+
465 Uttar Pradesh	2019	1	0
+-----+	+-----+	+-----+	+-----+
466 Uttar Pradesh	2019	2	78394040
+-----+	+-----+	+-----+	+-----+
467 Uttar Pradesh	2019	3	268142606
+-----+	+-----+	+-----+	+-----+
468 Uttar Pradesh	2019	4	324068625
+-----+	+-----+	+-----+	+-----+
469 Uttar Pradesh	2020	1	374282083
+-----+	+-----+	+-----+	+-----+
470 Uttar Pradesh	2020	2	383703534
+-----+	+-----+	+-----+	+-----+
471 Uttar Pradesh	2020	3	450784508
+-----+	+-----+	+-----+	+-----+
472 Uttar Pradesh	2020	4	552220798
+-----+	+-----+	+-----+	+-----+
473 Uttar Pradesh	2021	1	639718324
+-----+	+-----+	+-----+	+-----+
474 Uttar Pradesh	2021	2	673598864
+-----+	+-----+	+-----+	+-----+
475 Uttarakhand	2018	1	0
+-----+	+-----+	+-----+	+-----+
476 Uttarakhand	2018	2	0
+-----+	+-----+	+-----+	+-----+
477 Uttarakhand	2018	3	0
+-----+	+-----+	+-----+	+-----+

478	Uttarakhand	2018	4	0
+-----+		+-----+		+-----+
479	Uttarakhand	2019	1	0
+-----+		+-----+		+-----+
480	Uttarakhand	2019	2	7454279
+-----+		+-----+		+-----+
481	Uttarakhand	2019	3	24660988
+-----+		+-----+		+-----+
482	Uttarakhand	2019	4	28853867
+-----+		+-----+		+-----+
483	Uttarakhand	2020	1	32631265
+-----+		+-----+		+-----+
484	Uttarakhand	2020	2	31074793
+-----+		+-----+		+-----+
485	Uttarakhand	2020	3	40377348
+-----+		+-----+		+-----+
486	Uttarakhand	2020	4	52564888
+-----+		+-----+		+-----+
487	Uttarakhand	2021	1	59282260
+-----+		+-----+		+-----+
488	Uttarakhand	2021	2	78380036
+-----+		+-----+		+-----+
489	West Bengal	2018	1	0
+-----+		+-----+		+-----+
490	West Bengal	2018	2	0
+-----+		+-----+		+-----+
491	West Bengal	2018	3	0
+-----+		+-----+		+-----+
492	West Bengal	2018	4	0
+-----+		+-----+		+-----+
493	West Bengal	2019	1	0
+-----+		+-----+		+-----+
494	West Bengal	2019	2	49514201
+-----+		+-----+		+-----+
495	West Bengal	2019	3	176559011
+-----+		+-----+		+-----+
496	West Bengal	2019	4	244326613
+-----+		+-----+		+-----+
497	West Bengal	2020	1	207068218
+-----+		+-----+		+-----+
498	West Bengal	2020	2	198589332
+-----+		+-----+		+-----+
499	West Bengal	2020	3	246554831
+-----+		+-----+		+-----+
500	West Bengal	2020	4	291721919
+-----+		+-----+		+-----+
501	West Bengal	2021	1	316832674
+-----+		+-----+		+-----+
502	West Bengal	2021	2	275341466
+-----+		+-----+		+-----+

In [35]: *# 2. Identify trends in app usage by creating a line plot showing the number of*

```

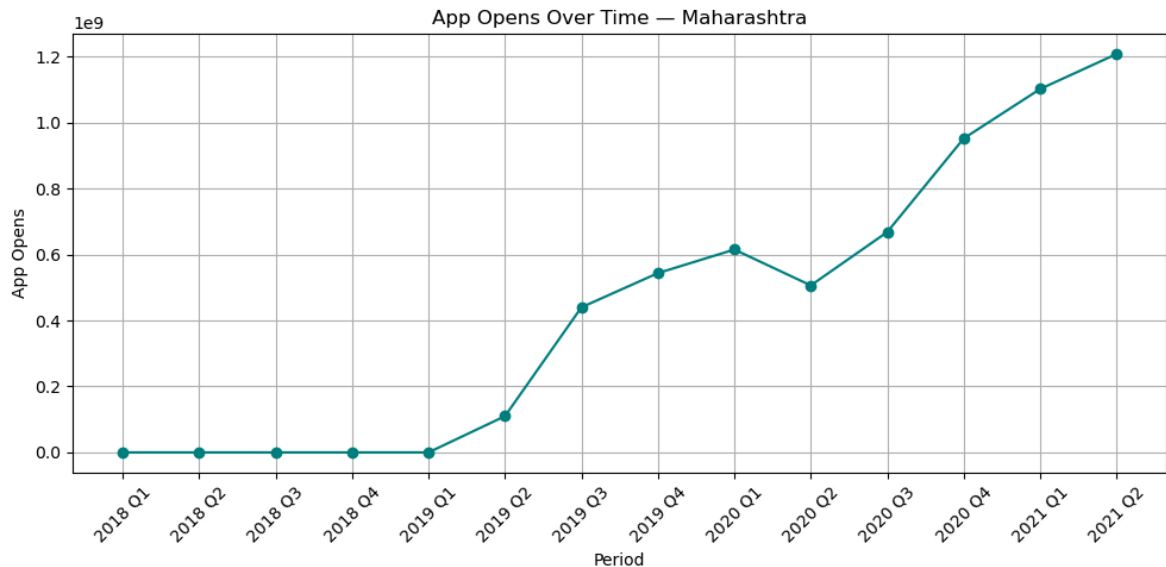
selected_state = 'Maharashtra'
state_data = app_usage_summary[app_usage_summary['State'] == selected_state]
state_data = state_data.copy()
state_data['Period'] = state_data['Year'].astype(str) + ' Q' + state_data['Quart

plt.figure(figsize=(10,5))
plt.plot(state_data['Period'], state_data['App Opens'], marker='o', color='teal'

```



```
plt.title(f'App Opens Over Time - {selected_state}')
plt.xlabel('Period')
plt.ylabel('App Opens')
plt.xticks(rotation=45)
plt.grid(True)
plt.tight_layout()
plt.show()
```

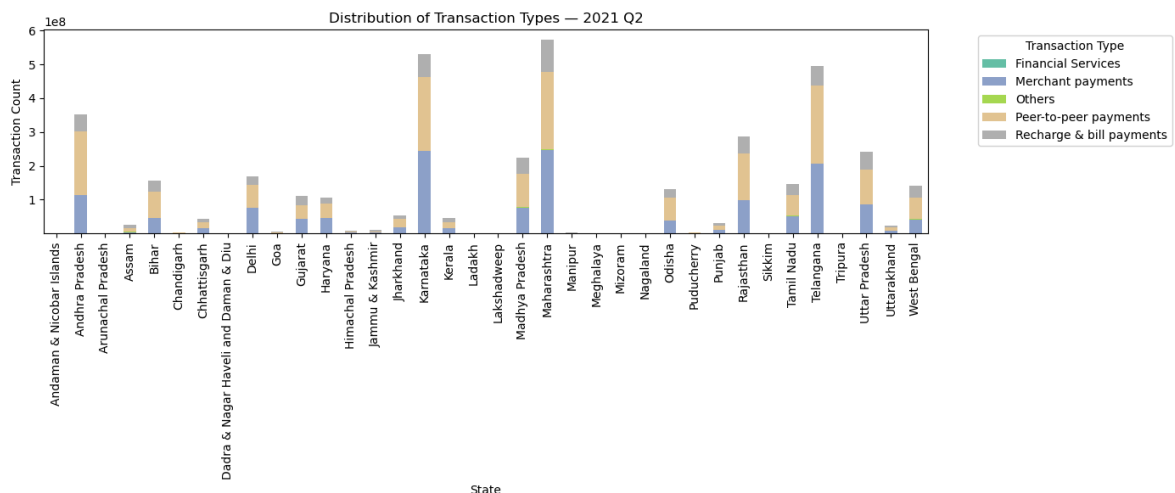


In [36]:

```
# Distribution of transaction types
# 1. Create a bar chart showing the distribution of different transaction types
latest_year = state_txn_split['Year'].max()
latest_quarter = state_txn_split[state_txn_split["Year"] == latest_year]["Quarter"].max()
latest_df = state_txn_split[(state_txn_split["Year"] == latest_year) & (state_txn_split["Quarter"] == latest_quarter)]

pivot = latest_df.pivot_table(index='State', columns='Transaction Type', values='Transaction Count')

ax = pivot.plot(kind='bar', stacked=True, figsize=(14,6), colormap='Set2')
plt.title(f'Distribution of Transaction Types — {latest_year} Q{latest_quarter}')
plt.ylabel('Transaction Count')
plt.xlabel('State')
plt.xticks(rotation=90)
plt.legend(title='Transaction Type', bbox_to_anchor=(1.05, 1), loc='upper left')
plt.tight_layout()
plt.show()
```



```
In [37]: # Find unique mapping between district name and district code
# 1. Identify the unique mapping between district names and district codes from
district_map = district_demo[['District', 'Code']].drop_duplicates()

# 2. Create a CSV file containing the unique district name and district code map
# 3. Export the CSV file.
district_map.to_csv("district_mapping.csv", index = False)
```

```
In [38]: #Task 3: Data Quality Checks
# 3.1: Ensure data consistency across state and district levels
# 1. For each state, calculate the total number of transactions, total transacti
# by summing up the values from the district level data.

district_agg = district_txn_users.groupby('State')[['Transactions', 'Amount (INR)
district_agg.rename(columns={
    'Transactions': 'District Transactions',
    'Amount (INR)': 'District Amount',
    'Registered Users': 'District Users'
}, inplace=True)

state_agg = state_txn_users.groupby('State')[['Transactions', 'Amount (INR)', 'Reg
state_agg.rename(columns={
    'Transactions': 'State Transactions',
    'Amount (INR)': 'State Amount',
    'Registered Users': 'State Users'
}, inplace=True)
```

```
In [39]: # 2. Compare the results with the corresponding values at the state level to ens
merged_df = pd.merge(district_agg, state_agg, on = 'State')
merged_df['Txn Mismatch'] = merged_df['District Transactions'] != merged_df['Sta
merged_df['Amount Mismatch'] = ~np.isclose(merged_df['District Amount'], merged_
merged_df['Users Mismatch'] = merged_df['District Users'] != merged_df['State Us

discrepancies = merged_df[(merged_df['Txn Mismatch']) | (merged_df['Amount Misma
```

```
In [40]: # 3. Display any discrepancies found between the district-level and state-level
discrepancies
```

```
Out[40]:
```

	State	District Transactions	District Amount	District Users	State Transactions	State Amount	S
1	Andhra Pradesh	1781091169	3.860292e+12	158007957	1491343199	3.187847e+12	13964
2	Arunachal Pradesh	8043799	2.225183e+10	1861689	8043799	2.225183e+10	186

```
In [41]: # Task 4: Data Merging and Advanced Analysis
# 4.1: Ratio of users to population by state
# 1. Merge the State Txn and Users dataset with the District Demographics dataset
# to the population for each state.

state_users = state_txn_users.groupby('State')['Registered Users'].sum().reset_i
state_population = district_demo.groupby('State')['Population'].sum().reset_inde

merged = pd.merge(state_users, state_population, on = 'State')
merged['User-population Ratio'] = merged['Registered Users']/merged['Population']
```

```
print(" Ratio of Registered Users to Population by State")  
print(tabulate(merged[['State', 'Registered Users', 'Population', 'User-populati  
                    headers='keys', tablefmt='grid', floatfmt=".4f"])
```

Ratio of Registered Users to Population by State			
State	Registered Users	Population	User-population Ratio
0 Andaman & Nicobar Islands	408396	380581	1.0731
1 Andhra Pradesh	139644224	49378776	2.8280
2 Arunachal Pradesh	1862214	1606047	1.1595
3 Assam	26860751	34461385	0.7794
4 Bihar	115284760	103817951	1.1105
5 Chandigarh	3801466	1055450	3.6017
6 Chhattisgarh	37448388	25867958	1.4477
7 Dadra & Nagar Haveli and Daman & Diu	2701112	586956	4.6019
8 Delhi	95374654	16787941	5.6811
9 Goa	4755320	1457723	3.2622
10 Gujarat	126380032	65930328	1.9169
11 Haryana	85564119	25855357	3.3093
12 Himachal Pradesh	13373980	6856509	1.9506
13 Jammu & Kashmir	9756438	12258093	

0.7959			
+-----+-----+-----+-----+			
-----+			
14 Jharkhand		44768682	32966238
1.3580			
+-----+-----+-----+-----+			
-----+			
15 Karnataka		203098564	60965960
3.3313			
+-----+-----+-----+-----+			
-----+			
16 Kerala		51267042	33387677
1.5355			
+-----+-----+-----+-----+			
-----+			
17 Ladakh		579825	276875
2.0942			
+-----+-----+-----+-----+			
-----+			
18 Lakshadweep		34223	64473
0.5308			
+-----+-----+-----+-----+			
-----+			
19 Madhya Pradesh		125339823	73943914
1.6951			
+-----+-----+-----+-----+			
-----+			
20 Maharashtra		315783658	112378989
2.8100			
+-----+-----+-----+-----+			
-----+			
21 Manipur		2317734	3187465
0.7271			
+-----+-----+-----+-----+			
-----+			
22 Meghalaya		1436472	3364915
0.4269			
+-----+-----+-----+-----+			
-----+			
23 Mizoram		605612	1091014
0.5551			
+-----+-----+-----+-----+			
-----+			
24 Nagaland		1440387	2335175
0.6168			
+-----+-----+-----+-----+			
-----+			
25 Odisha		80404103	41947358
1.9168			
+-----+-----+-----+-----+			
-----+			
26 Puducherry		2785162	1247953
2.2318			
+-----+-----+-----+-----+			
-----+			
27 Punjab		45811761	30510873
1.5015			
+-----+-----+-----+-----+			
-----+			
28 Rajasthan		149770064	68620629

```
In [42]: # 2. Create a column chart depicting the ratio of users to population by state.
```

State	User:Population Ratio
Delhi	1.1
Dadra & Nagar Haveli and Daman & Diu	2.8
Telangana	1.2
Chandigarh	0.8
Karnataka	1.1
Haryana	3.6
Goa	1.5
Andhra Pradesh	4.5
Maharashtra	5.2
Uttarakhand	3.2
Puducherry	1.9
Rajasthan	3.3
Sikkim	1.9
Ladakh	0.8
Himachal Pradesh	1.4
Gujarat	3.3
Odisha	1.6
Tamil Nadu	2.1
Madhya Pradesh	0.5
West Bengal	1.7
Kerala	2.8
Punjab	0.7
Chhattisgarh	0.4
Jharkhand	0.5
Uttar Pradesh	0.6
Arunachal Pradesh	1.9
Bihar	2.2
Andaman & Nicobar Islands	1.5
Tripura	2.2
Jammu & Kashmir	2.1
Assam	1.8
Manipur	4.1
Nagaland	1.0
Mizoram	1.2
Lakshadweep	2.3
Meghalaya	1.6

```
In [43]: # 4.2: Correlate population density with transaction volume
# 1. Merge the District Txn and Users dataset with the District Demographics dat

merged_district = pd.merge(district_txn_users,district_demo, on= ['State','District'])
merged_district.head()
```

Out[43]:

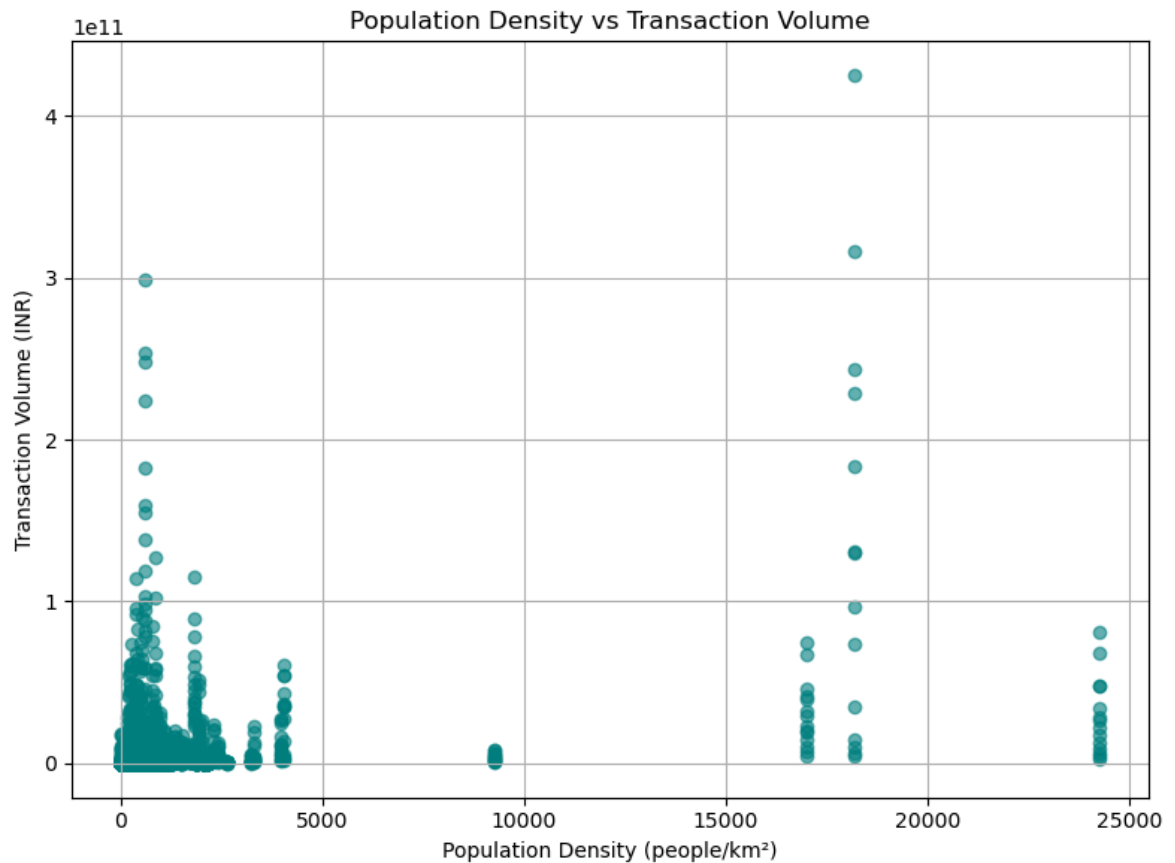
	State	Year	Quarter	District	Code_x	Transactions	Amount (INR)	ATV (INR)
0	Andaman & Nicobar Islands	2018	1	South Andaman	AN03	5688	1.256025e+07	2208.201361
1	Andaman & Nicobar Islands	2018	2	South Andaman	AN03	9395	2.394824e+07	2549.040502
2	Andaman & Nicobar Islands	2018	3	South Andaman	AN03	13511	4.426811e+07	3276.449742
3	Andaman & Nicobar Islands	2018	4	South Andaman	AN03	20136	7.541184e+07	3745.125189
4	Andaman & Nicobar Islands	2019	1	South Andaman	AN03	25683	8.550197e+07	3329.127142



```
In [44]: #2. Calculate the correlation between population density and transaction volume
correlation = merged_district['Density'].corr(merged_district['Amount (INR)'])
print(correlation)
```

0.33676543179108975

```
In [45]: #3. Create a scatter plot to visualize the correlation between population density and transaction volume
plt.figure(figsize=(8,6))
plt.scatter(merged_district['Density'], merged_district['Amount (INR)'], alpha=0.5)
plt.title('Population Density vs Transaction Volume')
plt.xlabel('Population Density (people/km²)')
plt.ylabel('Transaction Volume (INR)')
plt.grid(True)
plt.tight_layout()
plt.show()
```



```
In [46]: # 4.3: Average transaction amount per user
# 1. Merge relevant datasets to calculate the average transaction amount per use
agg_df = state_txn_users.groupby('State')[['Amount (INR)', 'Registered Users']].s
agg_df['ATV'] = agg_df['Amount (INR)'] / agg_df['Registered Users']

print("Average Transaction Amount per User by State")
print(tabulate(agg_df[['State', 'Amount (INR)', 'Registered Users', 'ATV']],
               headers='keys', tablefmt='grid', floatfmt=".2f"))
```


Average Transaction Amount per User by State

+-----+-----+-----+-----+			
---+-----+			
State		Amount (INR)	Registered Use
rs ATV			
+=====+=====+=====+=====			
===+=====+			
0 Andaman & Nicobar Islands		3641817860.75	4083
96 8917.37			
+-----+-----+-----+-----			
---+-----+			
1 Andhra Pradesh		3187847468851.51	1396442
24 22828.35			
+-----+-----+-----+-----			
---+-----+			
2 Arunachal Pradesh		22251830956.91	18622
14 11949.13			
+-----+-----+-----+-----			
---+-----+			
3 Assam		281408712657.44	268607
51 10476.58			
+-----+-----+-----+-----			
---+-----+			
4 Bihar		1639578926751.51	1152847
60 14221.99			
+-----+-----+-----+-----			
---+-----+			
5 Chandigarh		53712084630.82	38014
66 14129.31			
+-----+-----+-----+-----			
---+-----+			
6 Chhattisgarh		415635319208.15	374483
88 11098.88			
+-----+-----+-----+-----			
---+-----+			
7 Dadra & Nagar Haveli and Daman & Diu		18658784568.34	27011
12 6907.82			
+-----+-----+-----+-----			
---+-----+			
8 Delhi		1649942211116.08	953746
54 17299.59			
+-----+-----+-----+-----			
---+-----+			
9 Goa		44271871113.09	47553
20 9309.97			
+-----+-----+-----+-----			
---+-----+			
10 Gujarat		1105328681946.77	1263800
32 8746.07			
+-----+-----+-----+-----			
---+-----+			
11 Haryana		1059831565199.82	855641
19 12386.40			
+-----+-----+-----+-----			
---+-----+			
12 Himachal Pradesh		97865455329.56	133739
80 7317.60			
+-----+-----+-----+-----			
---+-----+			
13 Jammu & Kashmir		109495435910.39	97564

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```

64 | 17530.77 |
+---+-----+-----+-----+-----+-----+-----+-----+
---+-----+
| 29 | Sikkim | 14155544437.92 | 12791
99 | 11065.94 |
+---+-----+-----+-----+-----+-----+-----+-----+
---+-----+
| 30 | Tamil Nadu | 1481448044165.06 | 1324374
26 | 11186.02 |
+---+-----+-----+-----+-----+-----+-----+-----+
---+-----+
| 31 | Telangana | 4574245879737.88 | 1492242
14 | 30653.51 |
+---+-----+-----+-----+-----+-----+-----+-----+
---+-----+
| 32 | Tripura | 20970514761.53 | 36615
75 | 5727.18 |
+---+-----+-----+-----+-----+-----+-----+-----+
---+-----+
| 33 | Uttar Pradesh | 2399757104087.38 | 2462004
04 | 9747.17 |
+---+-----+-----+-----+-----+-----+-----+-----+
---+-----+
| 34 | Uttarakhand | 215071471849.20 | 237927
47 | 9039.37 |
+---+-----+-----+-----+-----+-----+-----+-----+
---+-----+
| 35 | West Bengal | 1452706824854.87 | 1442421
83 | 10071.30 |
+---+-----+-----+-----+-----+-----+-----+-----+
---+-----+

```

```

In [47]: # 2. Identify the top 5 states with the highest average transaction amount per u
# lowest average transaction amount per user.
agg_df.sort_values(by = 'ATV', ascending = False, inplace = True)

top_5 = agg_df.head(5)
print("Top 5 States by Avg Transaction Amount per User")
print(tabulate(top_5[['State', 'ATV']], headers='keys', tablefmt='grid', floatfm

# Bottom 5
bottom_5 = agg_df.tail(5)
print("\n Bottom 5 States by Avg Transaction Amount per User")
print(tabulate(bottom_5[['State', 'ATV']], headers='keys', tablefmt='grid', floa

```

Top 5 States by Avg Transaction Amount per User

	State	ATV
31	Telangana	30653.51
1	Andhra Pradesh	22828.35
15	Karnataka	21474.28
28	Rajasthan	17530.77
8	Delhi	17299.59

Bottom 5 States by Avg Transaction Amount per User

	State	ATV
12	Himachal Pradesh	7317.60
16	Kerala	7274.85
7	Dadra & Nagar Haveli and Daman & Diu	6907.82
32	Tripura	5727.18
18	Lakshadweep	5614.90

```
In [48]: # 4.4: Device brand usage ratio
# 1. Merge the State_DeviceData dataset with the State_Txn and Users dataset.

merge_df = pd.merge(state_device_data, state_txn_users, on=['State', 'Year', 'Quarter'])
merge_df.rename(columns={'Registered Users_x': 'Brand Users', 'Registered Users_y': 'Registered Users'})
merge_df.head(5)
```

Out[48]:

	State	Year	Quarter	Brand	Brand Users	Percentage	Transactions	Amount (INR)
0	Andaman & Nicobar Islands	2018	1	Xiaomi	1665	0.247033	6658	1.463176e+07
1	Andaman & Nicobar Islands	2018	1	Samsung	1445	0.214392	6658	1.463176e+07
2	Andaman & Nicobar Islands	2018	1	Vivo	982	0.145697	6658	1.463176e+07
3	Andaman & Nicobar Islands	2018	1	Oppo	501	0.074332	6658	1.463176e+07
4	Andaman & Nicobar Islands	2018	1	OnePlus	332	0.049258	6658	1.463176e+07

In [49]: # 2. Calculate the ratio of users using each device brand to the total number of

```

merge_df['Usage Ratio'] = merge_df['Brand Users']/merge_df['State Users']
merge_df = merge_df[['State', 'Year', 'Quarter', 'Brand', 'Brand Users', 'State

print("Device Brand Usage Ratio by State, Year, Quarter")
print(tabulate(merge_df[['State', 'Year', 'Quarter', 'Brand', 'Brand Users', 'St
                headers='keys', tablefmt='grid', floatfmt=".4f"))

```

Device Brand Usage Ratio by State, Year, Quarter

	State	Usage Ratio	Year	Quarter	Brand	Brand Users
State Users						
0	Andaman & Nicobar Islands	0.2470	2018	1	Xiaomi	1665
6740						
1	Andaman & Nicobar Islands	0.2144	2018	1	Samsung	1445
6740						
2	Andaman & Nicobar Islands	0.1457	2018	1	Vivo	982
6740						
3	Andaman & Nicobar Islands	0.0743	2018	1	Oppo	501
6740						
4	Andaman & Nicobar Islands	0.0493	2018	1	OnePlus	332
6740						
5	Andaman & Nicobar Islands	0.0469	2018	1	Realme	316
6740						
6	Andaman & Nicobar Islands	0.0340	2018	1	Apple	229
6740						
7	Andaman & Nicobar Islands	0.0335	2018	1	Motorola	226
6740						
8	Andaman & Nicobar Islands	0.0300	2018	1	Lenovo	202
6740						
9	Andaman & Nicobar Islands	0.0234	2018	1	Huawei	158
6740						
10	Andaman & Nicobar Islands	0.1015	2018	1	Others	684
6740						
11	Andaman & Nicobar Islands	0.2449	2018	2	Xiaomi	2303
9405						
12	Andaman & Nicobar Islands	0.2045	2018	2	Samsung	1923
9405						
13	Andaman & Nicobar Islands		2018	2	Vivo	1523

	9405	0.1619					
+-----+-----+-----+-----+-----+-----+-----+-----+							
14	Andaman & Nicobar Islands	2018	2	Oppo		708	
	9405	0.0753					
+-----+-----+-----+-----+-----+-----+-----+-----+							
15	Andaman & Nicobar Islands	2018	2	OnePlus		466	
	9405	0.0495					
+-----+-----+-----+-----+-----+-----+-----+-----+							
16	Andaman & Nicobar Islands	2018	2	Realme		465	
	9405	0.0494					
+-----+-----+-----+-----+-----+-----+-----+-----+							
17	Andaman & Nicobar Islands	2018	2	Motorola		319	
	9405	0.0339					
+-----+-----+-----+-----+-----+-----+-----+-----+							
18	Andaman & Nicobar Islands	2018	2	Apple		308	
	9405	0.0327					
+-----+-----+-----+-----+-----+-----+-----+-----+							
19	Andaman & Nicobar Islands	2018	2	Lenovo		244	
	9405	0.0259					
+-----+-----+-----+-----+-----+-----+-----+-----+							
20	Andaman & Nicobar Islands	2018	2	Huawei		230	
	9405	0.0245					
+-----+-----+-----+-----+-----+-----+-----+-----+							
21	Andaman & Nicobar Islands	2018	2	Others		916	
	9405	0.0974					
+-----+-----+-----+-----+-----+-----+-----+-----+							
22	Andaman & Nicobar Islands	2018	3	Xiaomi		2950	
	12149	0.2428					
+-----+-----+-----+-----+-----+-----+-----+-----+							
23	Andaman & Nicobar Islands	2018	3	Samsung		2409	
	12149	0.1983					
+-----+-----+-----+-----+-----+-----+-----+-----+							
24	Andaman & Nicobar Islands	2018	3	Vivo		2063	
	12149	0.1698					
+-----+-----+-----+-----+-----+-----+-----+-----+							
25	Andaman & Nicobar Islands	2018	3	Oppo		988	
	12149	0.0813					
+-----+-----+-----+-----+-----+-----+-----+-----+							
26	Andaman & Nicobar Islands	2018	3	OnePlus		617	
	12149	0.0508					
+-----+-----+-----+-----+-----+-----+-----+-----+							
27	Andaman & Nicobar Islands	2018	3	Realme		603	
	12149	0.0496					
+-----+-----+-----+-----+-----+-----+-----+-----+							
28	Andaman & Nicobar Islands	2018	3	Motorola		390	

	12149	0.0321					
29	Andaman & Nicobar Islands	2018	3	Apple		371	
	12149	0.0305					
30	Andaman & Nicobar Islands	2018	3	Huawei		314	
	12149	0.0258					
31	Andaman & Nicobar Islands	2018	3	Lenovo		299	
	12149	0.0246					
32	Andaman & Nicobar Islands	2018	3	Others		1145	
	12149	0.0942					
33	Andaman & Nicobar Islands	2018	4	Xiaomi		3719	
	15222	0.2443					
34	Andaman & Nicobar Islands	2018	4	Samsung		2936	
	15222	0.1929					
35	Andaman & Nicobar Islands	2018	4	Vivo		2742	
	15222	0.1801					
36	Andaman & Nicobar Islands	2018	4	Oppo		1268	
	15222	0.0833					
37	Andaman & Nicobar Islands	2018	4	Realme		760	
	15222	0.0499					
38	Andaman & Nicobar Islands	2018	4	OnePlus		721	
	15222	0.0474					
39	Andaman & Nicobar Islands	2018	4	Motorola		474	
	15222	0.0311					
40	Andaman & Nicobar Islands	2018	4	Apple		455	
	15222	0.0299					
41	Andaman & Nicobar Islands	2018	4	Huawei		398	
	15222	0.0261					
42	Andaman & Nicobar Islands	2018	4	Lenovo		377	
	15222	0.0248					
43	Andaman & Nicobar Islands	2018	4	Others		1372	

	15222	0.0901				
44	Andaman & Nicobar Islands	2019	1	Xiaomi	4576	
	18596	0.2461				
45	Andaman & Nicobar Islands	2019	1	Samsung	3567	
	18596	0.1918				
46	Andaman & Nicobar Islands	2019	1	Vivo	3420	
	18596	0.1839				
47	Andaman & Nicobar Islands	2019	1	Oppo	1600	
	18596	0.0860				
48	Andaman & Nicobar Islands	2019	1	Realme	897	
	18596	0.0482				
49	Andaman & Nicobar Islands	2019	1	OnePlus	855	
	18596	0.0460				

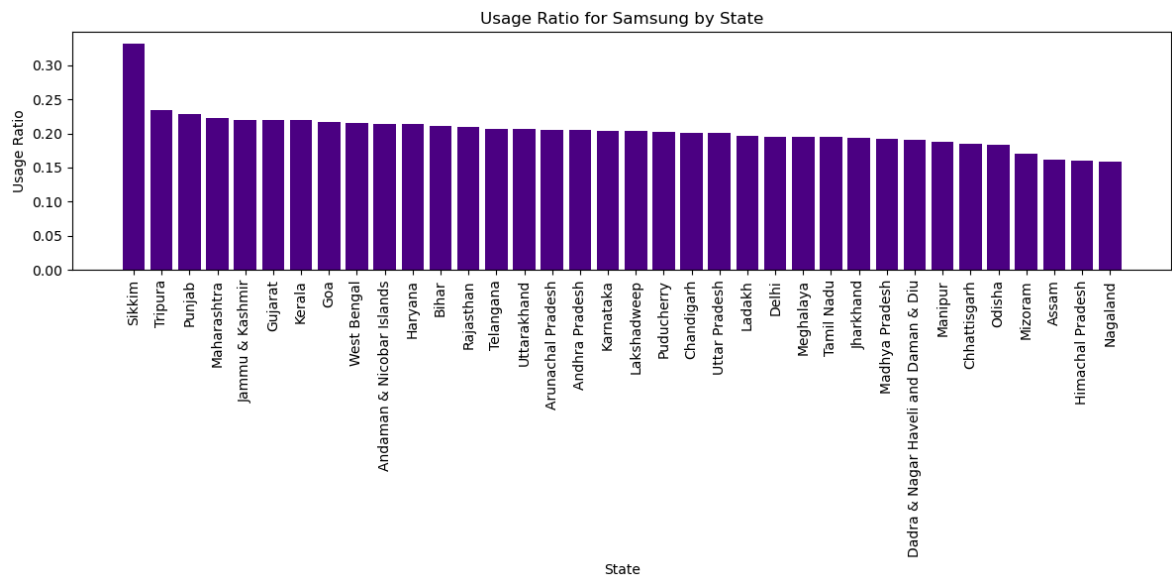
In [50]: *# 3. Create a bar chart depicting the device brand usage ratio for each state.*

```

selected_brand = 'Samsung'
brand_data = merge_df[merge_df['Brand'] == selected_brand].copy()
brand_data.sort_values('Usage Ratio', ascending=False, inplace=True)

# Plot bar chart
plt.figure(figsize=(12,6))
plt.bar(brand_data['State'], brand_data['Usage Ratio'], color='indigo')
plt.xticks(rotation=90)
plt.title(f'Usage Ratio for {selected_brand} by State')
plt.xlabel('State')
plt.ylabel('Usage Ratio')
plt.tight_layout()
plt.show()

```



```
In [51]: #Task 5: Data Visualization
# 5.1: Plot the total transactions and amount over time for a selected state
# 1. Create a line plot showing the total number of transactions and the total t

selected_State = 'Maharashtra'
state_data = state_txn_users[state_txn_users['State'] == selected_State].copy()

state_data['Period'] = state_data['Year'].astype(str) + ' Q' + state_data['Quarter']
state_data = state_data.sort_values(['Year', 'Quarter'])
state_data = state_data[['Period', 'Transactions', 'Amount (INR)']]

print(tabulate(state_data[['Period', 'Transactions', 'Amount (INR)']], headers='
```

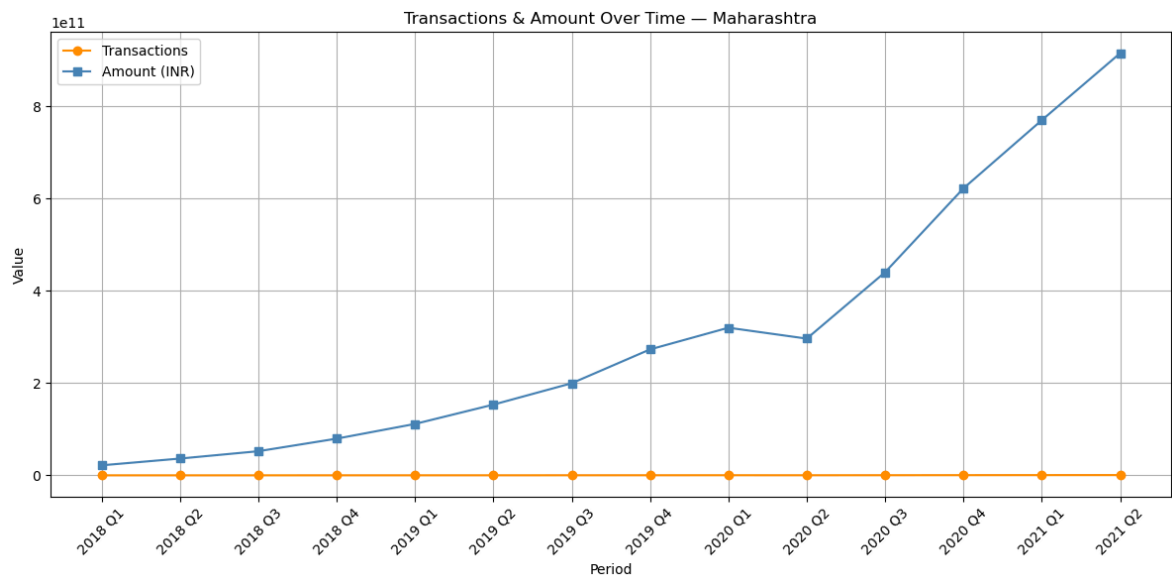
	Period	Transactions	Amount (INR)
280	2018 Q1	16387034	2.17116e+10
281	2018 Q2	22285740	3.63571e+10
282	2018 Q3	31538538	5.22608e+10
283	2018 Q4	46090223	7.95189e+10
284	2019 Q1	75079069	1.11421e+11
285	2019 Q2	101149853	1.53294e+11
286	2019 Q3	148735581	1.99618e+11
287	2019 Q4	201260620	2.72994e+11
288	2020 Q1	238944081	3.19995e+11
289	2020 Q2	184790761	2.9636e+11
290	2020 Q3	268310924	4.40307e+11
291	2020 Q4	407621004	6.22156e+11
292	2021 Q1	517860240	7.69887e+11
293	2021 Q2	573616486	9.15115e+11

```
In [52]: plt.figure(figsize=(12,6))

# Plot Transactions
plt.plot(state_data['Period'], state_data['Transactions'], marker='o', label='Tr

# Plot Amount
plt.plot(state_data['Period'], state_data['Amount (INR)'], marker='s', label='Am

plt.title(f'Transactions & Amount Over Time - {selected_state}')
plt.xlabel('Period')
plt.ylabel('Value')
plt.xticks(rotation=45)
plt.legend()
plt.grid(True)
plt.tight_layout()
plt.show()
```



In [53]: *# 5.2: Create a pie chart showing the distribution of transaction types for a sp*
1. Create a pie chart showing the distribution of different transaction types

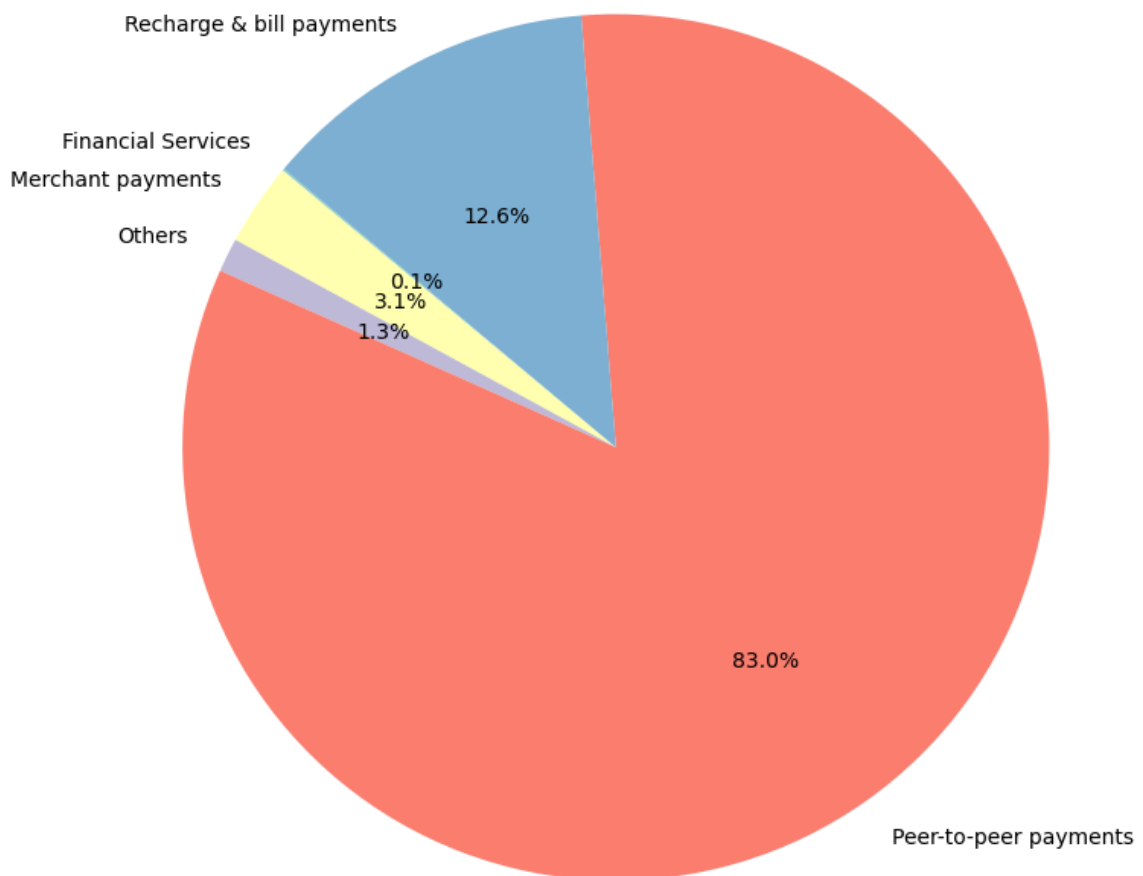
```
selected_state = 'Andaman & Nicobar Islands'
selected_year = 2018
selected_quarter = 1

filtered_df = state_txn_split[
    (state_txn_split['State'] == selected_state) &
    (state_txn_split['Year'] == selected_year) &
    (state_txn_split['Quarter'] == selected_quarter)
]

txn_summary = filtered_df.groupby('Transaction Type')['Amount (INR)'].sum()

plt.figure(figsize=(8,8))
plt.pie(txn_summary, labels=txn_summary.index, autopct='%1.1f%%',
        startangle=140, colors=plt.cm.Set3.colors)
plt.title(f'Transaction Type Distribution - {selected_state}, Q{selected_quarter}')
plt.tight_layout()
plt.show()
```

Transaction Type Distribution — Andaman & Nicobar Islands, Q1 2018



```
In [54]: # 5.3: Visualize the population density of districts in a selected state
# 1. Create a bar plot showing the population density of districts in a selected
# Select state
selected_state = 'Maharashtra'

# Filter districts for the selected state
state_districts = district_demo[district_demo['State'] == selected_state].copy()

# Sort by density (optional)
state_districts = state_districts.sort_values('Density', ascending=False)

plt.figure(figsize=(16,6))
plt.bar(state_districts['District'], state_districts['Density'], color='darkcyan')
plt.xticks(rotation=45)
plt.title(f'Population Density of Districts — {selected_state}')
plt.xlabel('District')
plt.ylabel('Population Density (people/km²)')
plt.tight_layout()
plt.grid(axis='y', linestyle='--', alpha=0.5)
plt.show()
```

