ANALYSIS OF USAGE PATTERNS OF DEBIT CARDS ISSUED BY PUBLIC SECTOR, PRIVATE SECTOR AND FOREIGN BANKS OPERATING IN INDIA

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Abstract: *A Debit Card is a plastic payment Card that provides the Cardholder electronic access to his or her bank account at a Bank/Financial institution. Some Cards have stored value which could be used for payments. Most cards relay a message to the Cardholder's bank to transfer funds from a payer's designated bank account. The Card can be used in lieu of cash while paying for purchases. There is high degree of positive correlation between number of cards and number of transactions at ATM, indicating that better of utilization ATM infrastructure can be ensured with issuance of more number of cards. However, low correlation between number of cards and number of transaction per card per month points to the fact that mere issuance of the card does not ensure its usage.*

Key Words: *Debit Card, ATM cum Debit Card, UnionPay, RuPay , Visa Card, MasterCard, Point of sales (POS), Correlation*

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INTRODUCTION

A Debit Card is a plastic payment Card that provides the Cardholder electronic access to his or her bank account at a financial institution. Some Cards have a stored value with which a payment may be effected. Most Cards relay a message to the Cardholder's bank to withdraw funds from a payer's designated bank account. The Card, where accepted, can be used instead of cash when making purchases. In some cases, the primary account number is assigned exclusively for use on the Internet and there is no physical Card .In many countries, the use of debit Cards has become so widespread that their volume has overtaken or entirely replaced cheques and, in many instances, cash transactions. The development of debit Cards, unlike credit Cards and charge Cards, has generally been country specific resulting in a number of different systems around the world, which were often incompatible. Since the mid-2000s, a number of initiatives have allowed debit Cards issued in one country to be used in other countries and allowed their use for internet and phone purchases. Unlike credit and charge Cards, payments using a debit Card are immediately transferred from the Cardholder's designated bank account (instead of them paying the money back at a later date). Debit Cards usually also allow for instant withdrawal of cash, acting as the ATM Card for withdrawing cash. Merchants may also offer cashback facilities to customers, where a customer can withdraw cash along with their purchase. Although many debit Cards are of the Visa or MasterCard brand, there are many other types of debit Cards, each accepted only within a particular country or region, for example Switch (now:Maestro) and Solo in the United Kingdom, Interac in Canada, Carte Bleue in France, Laser in Ireland, EC electronic cash (formerly Eurocheque) in Germany, UnionPay in China, RuPay in India and EFTPOS Cards in Australia and New Zealand. The need for cross-border compatibility and the advent of the euro recently led to many of these Card networks (such as Switzerland's "EC direkt", Austria's "Bankomatkasse" and Switch in the United Kingdom) being re-branded with the internationally recognized Maestro logo, which is part of the MasterCard brand. Some debit Cards are dual branded with the logo of the (former) national Card as well as Maestro (for example, EC Cards in Germany, Laser Cards in Ireland, Switch and Solo in the UK, Pinpas Cards in the Netherlands, Bancontact Cards in Belgium, etc.). The use of a debit Card system allows operators to package their product more effectively while monitoring customer spending. A new variety

of debit cards known as Prepaid debit Cards, also called reloadable debit Cards, appeal to a variety of users. The primary market for prepaid Cards are unbanked people, that is, people who do not use banks or credit unions for their financial transactions, possibly because of poor credit ratings. The advantages of prepaid debit Cards include being safer than carrying cash, worldwide functionality due to Visa and MasterCard merchant acceptance, not having to worry about paying a credit Card bill or going into debt, the opportunity for anyone over the age of 18 to apply and be accepted without regard to credit quality and the option to direct deposit paychecks and government benefits onto the Card for free. The prepaid bank Card, called "Bank Gift Card" too, has been invented in 2001 by a French, Laurent Granier who has two patents and copyrights (2001 and 2002), under the commercial name "SPIDERCUARD" (Trade Mark). Some of the first companies to enter this market were: MiCash, RushCard and Netspend, who gained high market share as a result of being first to market. However, since 1999, there have been several new providers, such as TransCash, 247Card and iKobo, that offer a number of other benefits, such as money remittance services, Card-to-Card transfers, and the ability to apply without a social security number.

PROCESSING SYSTEMS FOR DEBIT CARD TRANSACTIONS

There are currently three ways that debit Card transactions are processed:

i. **EFTPOS-** Also known as online debit or PIN debit,

ii. **Offline debit-** Also known as signature debit, and

iii. **Electronic Purse Card System-** One physical Card can include the functions of all three types, so that it can be used in a number of different circumstances.

i.   Online debit system- Online debit Cards require electronic authorization of every transaction and the debits are reflected in the user's account immediately. The transaction may be additionally secured with the personal identification number (PIN) authentication system; some online Cards require such authentication for every transaction, essentially becoming enhanced automatic teller machine (ATM) Cards. One difficulty with using online debit Cards is the necessity of an electronic authorization device at the point of sale (POS) and sometimes also a separate PIN pad to enter the PIN, although this is becoming commonplace for all Card transactions in many countries. Overall, the online debit Card is generally viewed as superior to the offline debit Card because of its more secure

authentication system and live status, which alleviates problems with processing lag on transactions. Some on-line debit systems are using the normal authentication processes of Internet banking to provide real-time on-line debit transactions. The most notable of these are iDEAL and POLI.

ii.   Offline debit system- Offline debit Cards have the logos of major credit Cards (for example, Visa or MasterCard) or major debit Cards (for example, Maestro in the United Kingdom and other countries) and are used at the point of sale like a credit Card (with payer's signature). This type of debit Card may be subject to a daily limit, and/or a maximum limit equal to the current/checking account balance from which it draws funds. Transactions conducted with offline debit Cards require 2–3 days to be reflected on users' account balances. In some countries and with some banks and merchant service organizations, a "credit" or offline debit transaction is without cost to the purchaser beyond the face value of the transaction, while a fee may be charged for a "debit" or online debit transaction (although it is often absorbed by the retailer). Other differences are that online debit purchasers may opt to withdraw cash in addition to the amount of the debit purchase (if the merchant supports that functionality); also, from the merchant's standpoint, the merchant pays lower fees on online debit transaction as compared to "credit" (offline).

iii.   A. Electronic purse Card system- Smart-Card-based electronic purse systems (in which value is stored on the Card chip, not in an externally recorded account, so that machines accepting the Card need no network connectivity) are in use nowadays.

OBJECTIVE OF THE STUDY

The study has been carried out for gaining an insight and understanding of

    i.   Usage Pattern of Debit Cards
    ii.   Correlation between various factors determining the usage pattern of Debit Cards.

METHODOLOGY AND PROCESS

Study is based on an analysis of secondary data sourced from the website of the Reserve Bank of India in regard to the information available in respect of Debit Cards issued by the Public Sector, Private Sector and Foreign Banks operating in India.

LIMITATIONS OF THE STUDY

The study is restricted to the secondary data available on RBI website.

STATISTICAL ANALYSIS OF DEBIT CARD DATA

Data about the number of cards and transaction details have been collected from the RBI website and the same has been processed for the month of November, 2013, which has been used in this study.

Table-I
ATM & Card Statistics - Scheduled Commercial Banks*

	Bank Name	Debit Cards			
	Scheduled Commercial Banks	No .of outstanding cards as at the end of the month	No. of Transactions (Actuals)		Amount of transactions (Rs Milions)	
			ATM	POS	ATM	POS
1	Punjab National Bank	23723688	42160450	1946244	71615.09	2472.51
2	Bank of India	15833596	13854347	1306316	34193.70	1547.70
3	Canara Bank	12532498	13097261	794133	36792.20	1319.10
4	Bank of Baroda	12465979	10224683	1161613	41966.80	1534.10
5	Union Bank of India	11184840	10990240	739453	34816.00	1159.80
6	Indian Bank	10745126	11684051	758738	24004.50	791.60
7	Andhra Bank	9249591	10361335	656622	18988.50	838.50
8	Central Bank of India	6090916	13437663	276011	46581.60	606.10
9	Syndicate Bank	6012994	7691742	323257	19535.10	549.80
10	Corporation Bank	5584912	3217672	571901	11456.10	894.30
11	Indian Overseas Bank	4909292	3632595	443400	12517.90	895.30
12	Oriental Bank of Commerce	4679040	4129347	210884	16144.29	418.97
13	Bank of Maharashtra	4085692	3459188	441502	9057.19	577.83
14	UCO Bank	3801818	3174334	349768	12198.50	440.30
15	Vijaya Bank	2956779	2745579	207475	8607.86	384.15
16	Allahabad Bank	2531314	3237077	117480	9301.60	263.60
17	United Bank of India	2369607	2592162	184391	9846.10	316.90
18	Dena Bank	2292322	2392865	183300	8351.92	250.37
19	Punjab and Sind Bank	406205	275584	2518	1111.50	6.90

*Source-RBI Website

Table- II

ATM & Card Statistics - State Bank Group*

Bank Name		Debit Cards			
State Bank Group	No .of outstanding cards as at the end of the month	No. of Transactions (Actuals)		Amount of transactions (Rs Milions)	
		ATM	POS	ATM	POS
1 State Bank of India	127248000	203335000	11071000	584959.80	17048.80
2 State Bank of Hyderabad	8819655	14183452	416393	35906.50	794.30
3 State Bank of Travancore	7915359	7992599	327321	23640.99	608.50
4 IDBI Ltd.	6042406	6989358	1054122	27477.77	1565.22
5 State Bank of Bikaner & Jaipur	5884360	7381840	214996	22251.78	269.13
6 State Bank of Patiala	4370268	4563638	147202	14098.67	278.05
7 State Bank of Mysore	3530073	5397193	209742	13140.00	448.70

Table-III

ATM & Card Statistics - Old Private Sector Banks

Bank Name		Debit Cards			
Old Private Sector Banks	No .of outstanding cards as at the end of the month	No. of Transactions (Actuals)		Amount of transactions (Rs Milions)	
		ATM	POS	ATM	POS
1 Federal Bank Limited	3562796	3417073	384173	14476.20	624.50
2 South Indian Bank Ltd	3012462	1999962	156506	6654.50	296.60
3 Karur Vysya Bank Ltd	2656389	3149147	321797	12704.21	426.24
4 Karnataka Bank Ltd.	2059819	1969222	226021	6266.50	345.10
5 Jammu & Kashmir Bank	1504048	2870015	45621	13189.78	164.55
6 ING Vysya Bank	1282553	2213146	213761	6393.00	474.30
7 City Union Bank Ltd	1133481	1440145	183652	4767.00	218.99
8 Dhanalaxmi Bank Ltd.	804601	424163	51378	1499.90	76.50
9 Tamilnadu Mercantile Bank Ltd.	615226	2061146	33381	7875.20	86.00
10 Catholic Syrian Bank Ltd.	543638	282631	14297	751.21	35.31
11 Lakshmi Vilas Bank Ltd.	441001	1342621	116296	4161.20	313.60
12 Ratnakar Bank Ltd.	75060	147620	12830	426.13	21.41

Table-III

ATM & Card Statistics - New Private Sector Banks

Bank Name		Debit Cards			
New Private Sector Banks		No .of outstanding cards as at the end of the month	No. of Transactions (Actuals)		Amount of transactions (Rs Milions)	
			ATM	POS	ATM	POS
1	ICICI Bank Ltd.	21014427	31328329	8783452	139124.25	15045.03
2	HDFC Bank Ltd.	17297969	30426316	8425986	131874.81	13575.36
3	Axis Bank Ltd.	13590074	26774689	4608309	113822.54	7629.31
4	IndusInd Bank Ltd	1462578	1435071	236537	5896.80	405.10
5	Kotak Mahindra Bank Ltd	1068920	2454249	656264	8958.73	1019.60
6	Yes Bank Ltd.	536564	1093389	246747	3911.17	415.20
7	Development Credit Bank Ltd.	165172	332195	52457	1432.10	95.60

Table-IV

ATM & Card Statistics - Foreign Banks in India

Bank Name		Debit Cards			
		No .of outstanding cards as at the end of the month	No. of Transactions (Actuals)		Amount of transactions (Rs Milions)	
Foreign Banks in India			ATM	POS	ATM	POS
1	Citibank	1794778	3634925	1903630	12869.52	4279.90
2	Standard Chartered Bank	710015	1359195	628349	4954.10	1152.30
3	HSBC	606629	485131	296907	2246.90	754.91
4	RBS (ABN AMRO)	164096	286372	88655	1227.44	178.46
5	Deutsche Bank	76200	196315	89542	810.15	189.83
6	DBS Ltd.	14963	61134	8261	167.10	19.00
7	Barclays Bank	4491	691	332	4.26	1.78
8	American Express Bkg. Corp.	0	0	0	0.00	0.00
	Total	**3371172**	**6023763**	**3015676**	**22279.46**	**6576.18**

Table-V

TRANSACTIONS PER CARD AT ATM & POS –PER MONTH- RELATIVE POSITION

PUBLIC SECTOR BANKS

	Bank Name	Debit Cards				
	Scheduled Commercial Banks	No .of outstanding cards as at the end of the month	No. of Transactions (Actuals)		Transaction per card at ATM	Transaction per card at POS
			ATM	POS		
1	Central Bank of India	6090916	13437663	276011	2.21	0.05
2	Punjab National Bank	23723688	42160450	1946244	1.78	0.08
3	Syndicate Bank	6012994	7691742	323257	1.28	0.05
4	Allahabad Bank	2531314	3237077	117480	1.28	0.05
5	Andhra Bank	9249591	10361335	656622	1.12	0.07
6	United Bank of India	2369607	2592162	184391	1.09	0.08
7	Indian Bank	10745126	11684051	758738	1.09	0.07
8	Canara Bank	12532498	13097261	794133	1.05	0.06
9	Dena Bank	2292322	2392865	183300	1.04	0.08
10	Union Bank of India	11184840	10990240	739453	0.98	0.07
11	Vijaya Bank	2956779	2745579	207475	0.93	0.07
12	Oriental Bank of Commerce	4679040	4129347	210884	0.88	0.05
13	Bank of India	15833596	13854347	1306316	0.87	0.08
14	Bank of Maharashtra	4085692	3459188	441502	0.85	0.11
15	UCO Bank	3801818	3174334	349768	0.83	0.09
16	Bank of Baroda	12465979	10224683	1161613	0.82	0.09
17	Indian Overseas Bank	4909292	3632595	443400	0.74	0.09
18	Punjab and Sind Bank	406205	275584	2518	0.68	0.01
19	Corporation Bank	5584912	3217672	571901	0.58	0.10
	State Bank Group					
1	State Bank of Hyderabad	8819655	14183452	416393	1.61	0.05
2	State Bank of India	127248000	203335000	11071000	1.60	0.09
3	State Bank of Mysore	3530073	5397193	209742	1.53	0.06
4	State Bank of	5884360	7381840	214996	1.25	0.04

	Bikaner & Jaipur					
5	IDBI Ltd.	6042406	6989358	1054122	1.16	0.17
6	State Bank of Patiala	4370268	4563638	147202	1.04	0.03
7	State Bank of Travancore	7915359	7992599	327321	1.01	0.04

Table-VI

TRANSACTIONS PER CARD AT ATM & POS –PER MONTH- RELATIVE POSITION

PRIVATE SECTOR BANKS

	Bank Name	Debit Cards				
	Private Sector Banks	No .of outstanding cards as at the end of the month	No. of Transactions (Actuals)		Transaction per card at ATM	Transaction per card at POS
			ATM	POS		
	Old Private Sector Banks					
1.	Tamilnadu Mercantile Bank Ltd.	615226	2061146	33381	3.35	0.05
2.	Lakshmi Vilas Bank Ltd.	441001	1342621	116296	3.04	0.26
3.	Ratnakar Bank Ltd.	75060	147620	12830	1.97	0.17
4.	Jammu & Kashmir Bank	1504048	2870015	45621	1.91	0.03
5.	ING Vysya Bank	1282553	2213146	213761	1.73	0.17
6.	City Union Bank Ltd	1133481	1440145	183652	1.27	0.16
7.	Karur Vysya Bank Ltd	2656389	3149147	321797	1.19	0.12
8.	Federal Bank Limited	3562796	3417073	384173	0.96	0.11
9.	Karnataka Bank Ltd.	2059819	1969222	226021	0.96	0.11
10.	South Indian Bank Ltd	3012462	1999962	156506	0.66	0.05
11.	Dhanalaxmi Bank Ltd.	804601	424163	51378	0.53	0.06
12.	Catholic Syrian Bank Ltd.	543638	282631	14297	0.52	0.03
	New Private Sector Banks					
1.	Kotak Mahindra Bank Ltd	1068920	2454249	656264	2.30	0.61
2.	Yes Bank Ltd.	536564	1093389	246747	2.04	0.46
3.	Development Credit Bank Ltd.	165172	332195	52457	2.01	0.32
4.	Axis Bank Ltd.	13590074	26774689	4608309	1.97	0.34
5.	HDFC Bank Ltd.	17297969	30426316	8425986	1.76	0.49

6.	ICICI Bank Ltd.	21014427	31328329	8783452	1.49	0.42
7.	IndusInd Bank Ltd	1462578	1435071	236537	0.98	0.16
	Foreign Banks in India					
1.	DBS Ltd.	14963	61134	8261	4.09	0.55
2.	Deutsche Bank	76200	196315	89542	2.58	1.18
3.	Citibank	1794778	3634925	1903630	2.03	1.06
4.	Standard Chartered Bank	710015	1359195	628349	1.91	0.88
5.	RBS (ABN AMRO)	164096	286372	88655	1.75	0.54
6.	HSBC	606629	485131	296907	0.80	0.49
7.	Barclays Bank	4491	691	332	0.15	0.07

SUMMARY OF FINDINGS

Average Transaction per card per month at ATM- While Foreign Banks registered highest number of transactions per card per month, SBI was in the middle and Public Sector Banks were last in the order.

BANK TYPE	Average Transaction per card per month at ATM
FOREIGN BANKS	1.90
NEW PRIVATE SECTOR BANKS	1.77
SBI	1.60
OLD PRIVATE SECTOR BANKS	1.51
STATE BANK GROUP	1.31
PUBLIC SECTOR BANKS	1.06
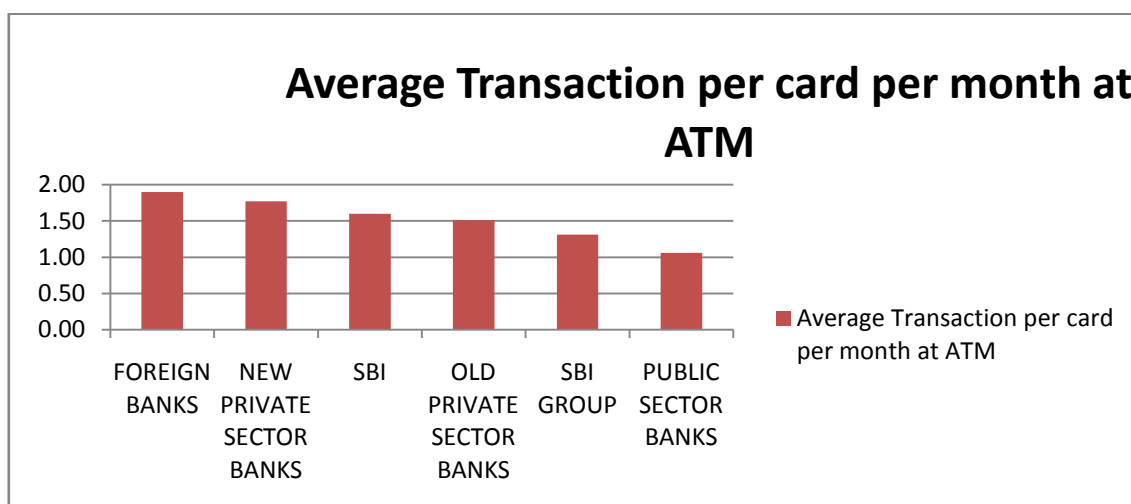
Fig 1-Average Transaction per ATM per month

Mean Transactions per ATM per Month- State Bank group was at the top in this category and SBI second highest in this category. At the lowest level were the New Private Sector Banks.

BANK TYPE	MEAN TRANSACTION PER ATM PER MONTH
STATE BANK GROUP	5805
SBI	5783
FOREIGN BANKS	3813
PUBLIC SECTOR	3400
OLD PRIVATE SECTOR	2302
NEW PRIVATE SECTOR	2031
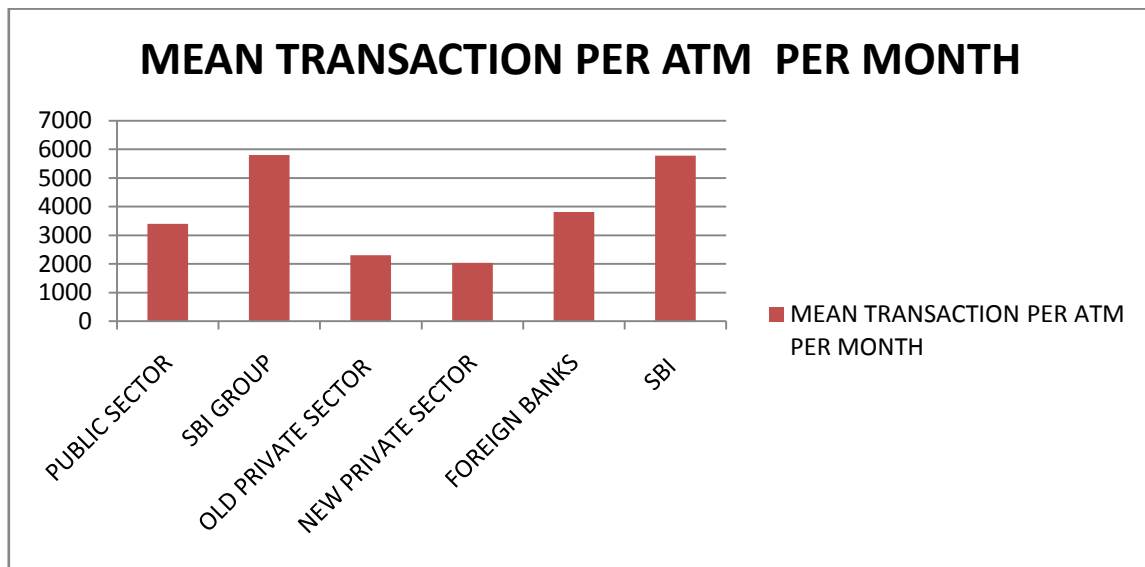
Fig.2-Mean Transactions per ATM per month

Mean Transactions per POS per month- While State Bank Group was at the top, SBI was at the near bottom. A possible explanation could be the recent thrust in addition of a large number of New POS terminals which are yet to initiated operationally.

BANK TYPE	MEAN TRANSACTIONS PER POS PER MONTH
PUBLIC SECTOR	331
STATE BANK GROUP	1127
OLD PRIVATE SECTOR	102
NEW PRIVATE SECTOR	265
FOREIGN BANKS	44
SBI	97

MEAN TRANSACTIONS PER POS PER MONTH
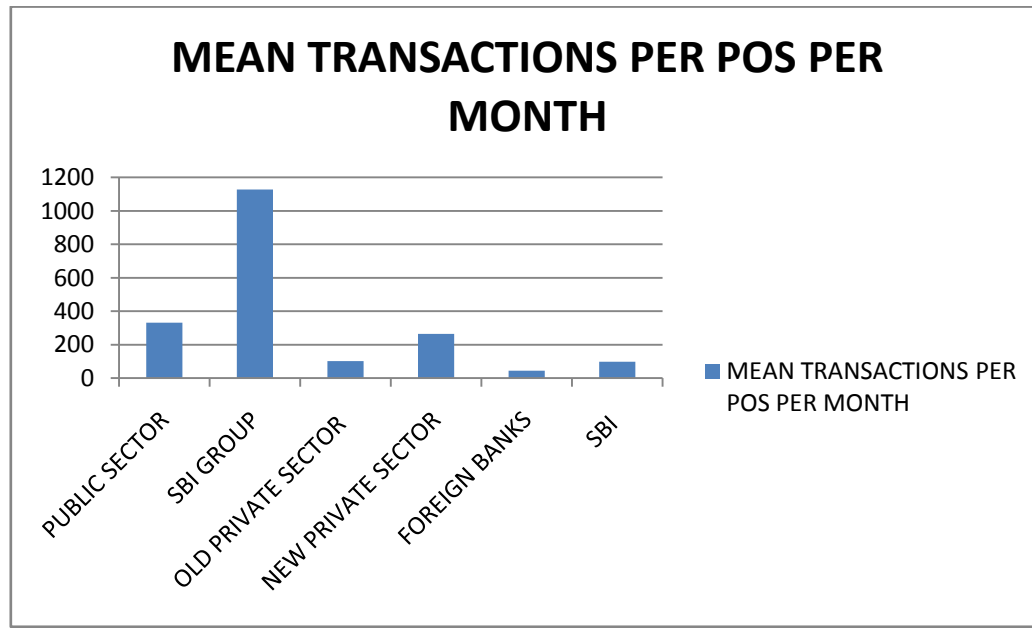
Fig 3- Mean Transactions per POS per month

CORRELATION ANALYSIS

CORRELATION

Pearson's correlation coefficient between two variables is defined as the covariance of the two variables divided by the product of their standard deviations.

$$\rho_{X,Y} = corr(X,Y) = \frac{cov(X,Y)}{\sigma_X \sigma_Y}$$

$$r = \frac{1}{(n-1)} \sum \frac{(X - \mu_X)(Y - \mu_Y)}{\sigma_X \sigma_Y}$$

For a sample

Pearson's correlation coefficient when applied to a sample is commonly represented as

$$r = \frac{\sum_{i=1}^{n}(X_i - \bar{X})(Y_i - \bar{Y})}{\sqrt{\sum_{i=1}^{n}(X_i - \bar{X})^2}\sqrt{\sum_{i=1}^{n}(Y_i - \bar{Y})^2}}$$

An equivalent expression gives the correlation coefficient as the mean of the products of the standard scores. Based on a sample of paired data (X_i, Y_i), the sample Pearson correlation coefficient is

$$r = \frac{1}{n-1} \sum_{i=1}^{n} \left(\frac{X_i - \bar{X}}{s_X}\right)\left(\frac{Y_i - \bar{Y}}{s_Y}\right)$$

where

$$\frac{X_i - \bar{X}}{s_X}, \ \bar{X} = \frac{1}{n}\sum_{i=1}^{n} X_i, \ \text{and } s_X = \sqrt{\frac{1}{n-1}\sum_{i=1}^{n}(X_i - \bar{X})^2}$$

are the standard score, sample mean, and sample standard deviation, respectively.

Interpretation

The correlation coefficient ranges from −1 to 1. A value of 1 implies that a linear equation describes the relationship between X and Y perfectly, with all data points lying on a line for which Y increases as X increases. A value of −1 implies that all data points lie on a line for which Y decreases as X increases. A value of 0 implies that there is no linear correlation between the variables.

CORRELATION ANALYSIS- NUMBER OF DEBIT CARDS AND TRANSACTION AT ATM AND POS

Correlation between number of Cards and Transaction per card per month at ATM	0.317
Correlation between number of Cards and Number of Transactions at ATM	0.910
Correlation between number of Cards and Transaction per card per month at POS	0.257
Correlation between number of Cards and Number of Transactions at POS	0.972

Interpretation- High degree of positive correlation between number of cards and number of transactions indicates that more the number of cards issued, the more number of transactions are observed which leads to better utilization of ATM infrastructure. However, low positive correlation between number of cards and number of transactions per month indicates that mere issuance of the cards does not ensure the repeated use of cards. Probably some other factors determine the repeated use of cards at ATM. Similar is the case in respect of the transactions at the POS. This aspect may require a separate focused study on the lesser used cards to pinpoint the possible factors like literacy, awareness about the procedure or economic standard of the cardholder etc.

Correlation between number of Cards and Number of Transactions at ATM
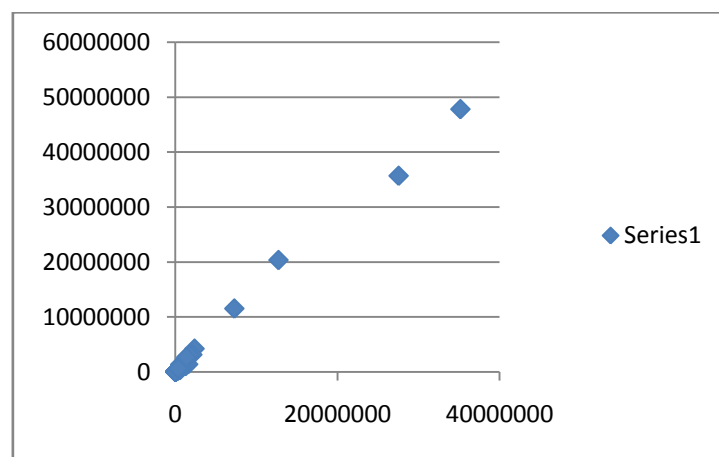

Fig .4- Correlation between number of Cards and Number of Transactions at ATM

CONCLUSION

Average Transaction per card per month at ATM were highest in Foreign Banks (1.90), SBI was in the middle (1.60) and Public Sector Banks were last in the order (1.06). In Mean Transactions per ATM per Month, SBI group was at the top (5805), SBI second highest (5783) and New Private Sector Banks were at the tail end (2031). Anaysis of Mean Transactions per POS per month indicated that SBI Group was at the top (1127) but SBI was at the near bottom (97), while Public Sector Banks were somewhere in the middle (331). A possible explanation could be the recent thrust in addition of a large number of New POS which have not yet taken off.

There is high degree of positive correlation between number of cards and number of transactions at ATM (0.91), indicating that better of utilization ATM infrastructure can be ensured with issuance of more number of cards. However, low correlation between number of cards and number of transaction per card per month (0.31) points to the fact that mere issuance of the card does not ensure its usage.

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