

HBFC Bank (Personal Loans)

Project report

Objective: -

understand the variables and the impact bank had on Personal Loans so that the bank can leverage the insights to reach out to the right customers who have a higher probability of purchasing the loan.

Submitted by:

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The data consists of the following variables

ID	Customer ID
Age	Customer's age in years
Experience	Years of professional experience
Income	Annual income of the customer (\$000)
ZIP Code	Home Address ZIP code.
Family Members	Family size of the customer
CCAvg	Avg. spending on credit cards per month (\$000)
Education	Education Level. 1: Undergrad; 2: Graduate; 3: Advanced/Professional
Mortgage	Value of house mortgage if any. (\$000)
Personal Loan	Did this customer accept the personal loan offered in the last campaign?
Securities Account	Does the customer have a securities account with the bank?
TD Account	Does the customer have a Term deposit (Including Fixed and Recurring Deposits) account with the bank?
Online	Does the customer use internet banking facilities?
Credit Card	Does the customer use a credit card issued by the bank?

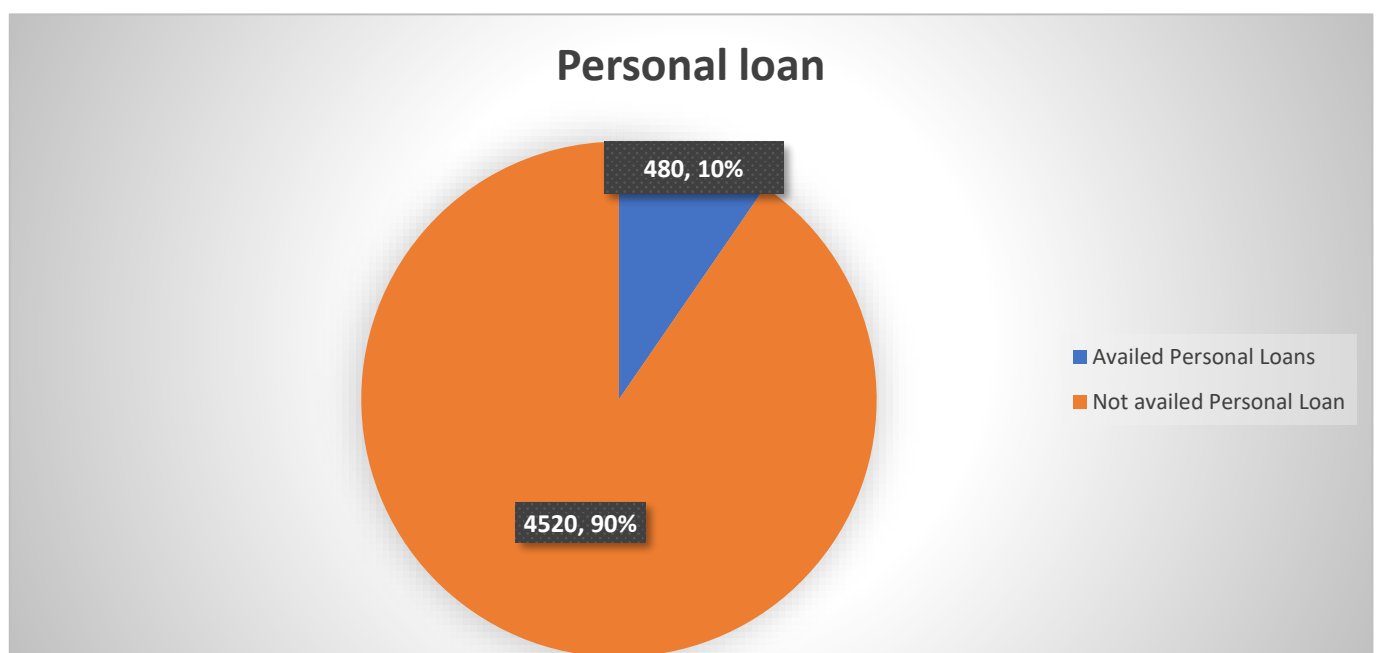
Deliverables:

1. What percentage of the bank's customers (according to the data) have availed Personal Loans?

- Out of 5000 customers only 10%(480) customers have taken the loan and rest 90%(4520) have not taken loan from the bank.

(**Approach used:-** count function to know total no of customers , count if function to how many have taken loan or not)

Total no of customer's	Availed Personal Loans	Not availed Personal Loan
5000	480	4520



2. **Generate a table with min, max, median & average for all numeric variables (age, experience, income, family members, CCAvg, Mortgage). What are your observations?**

.	min	max	median	average	round of averages
age	23	67	45	45.3384	45
experience	0	43	20	20.1348	20
income	8	224	64	73.7742	74
family members	1	4	2	2.397230028	2
CC avg	0	10	1.5	1.937938	2
mortgage	0	635	0	56.4988	56

➤ Observations based on the above table :-

❖ Observations' on age

- As we can see from the above table the youngest customers out of 5000 customers are 23years old, there are twelve 23yaer old customers and all the 23yesr old customers are either graduates or undergraduates and none of 23yesr old customers have taken personal loan and they do not have TD account as well.
- The oldest customers out of 5000 customers are 67years old customer's, there are twelve 67yaer old customers and all 67yers old customers have 40+ years of professional experience and not even one 67years old customers have taken personal loan .
the age gape between youngest and oldest customers is almost 44years
- median age provides age distribution of the population. It provides the midpoint of the population, the number of people who are younger than the median age as there are older than it.
45years is the middle age of the population that comes in between the youngest(23years) and the oldest(67year) customers.

- Average age tell us what age most of the population fall closest to that is approximately 45years in this case. There are almost 127 , 45yera old customer's.

❖ Observations On experience

- In this data of 5000 customer's there are 66 people with 0 work experience and they all fall under the age category of 24-27years
- There 3 customers with 43yers of work experience that is the maximum work experience out of all, they all are 67yesr old and none of them have personal loan or security accounts.
- Median experience provides experience distribution of the population .It provides a midpoint of the population experience, the number of people who have no work experience and people who have maximum work experience
- 20years work experience is the middle work experience of the population that comes in between the lowest 0 work experience and the highest 43 years of experience.
- Average work experience tell us what most of the population fall closest to that is approximately 20.13 years of work experience in this case, there are 128 people with 20yesr of work experience.

❖ Observations On income

In this data of 5000 customer's there are 23 people with \$8 as their annual income they all fall under the age category of 30-60years, and none of them have taken personal loans or have TD account.

There is only one person with \$224 as annual income that is the maximum annual income out of all, and the customer is 48years old with 23years of work experience

median income is the income which is higher than half of the income and lower than the other half of the income

\$64 is the median annual income that come in between highest \$224 and lowest \$8 annual income, there are 60 people with \$64 as their annual income.

average income tell us the per capita income or average income earned per person in the given population in that year . \$73.7 is the average income of this 5000 customers, there are 44 customers who earn \$73 as their annual income.

❖ Observations On number of family members

Out of 5000 customers ,there are 1464 customers who have only one family member that is the minimum number of family members and 1217 customers who have four family members that is the maximum number of family members

median family members is 2family members and the average family member out of the population is 2family members for a customer , there are 1292 customers with 2 family members

❖ Observations On CC avg (Avg. spending on credit cards per month)

- \$0 is the minimum Avg. spending on credit card per month of customers there are 106 customers who don't not spend using credit card .
- \$10 is the maximum Avg. spending on credit cards per month of customers there are only 3 customers who have spent the maximum using credit card
- The median Avg. spending on credit cards per month is \$1.5, there are 178 customers with \$1.5 as their Avg. spending on credit cards per month.
- The average . spending on credit cards per month is \$2, there are 188 customers with \$2 as their Avg. spending on credit cards per month.

❖ Observations On mortgage

\$0 is the minimum mortgage that is Value of house mortgage, out 5000 customers 3462 customers have \$0 mortgage and only one customer has \$635 as mortgage that is maximum mortgage

Average mortgage is \$56.

(approach used: - used min, max, median average and sorting functions, round function to round of decimals and countif function to count how many variables are in that specific category.)

3. Create a new categorical variable for Experience using 4 categories

a. 0 to 10 years

b. 11 to 20 years

c. 21 to 30 years and

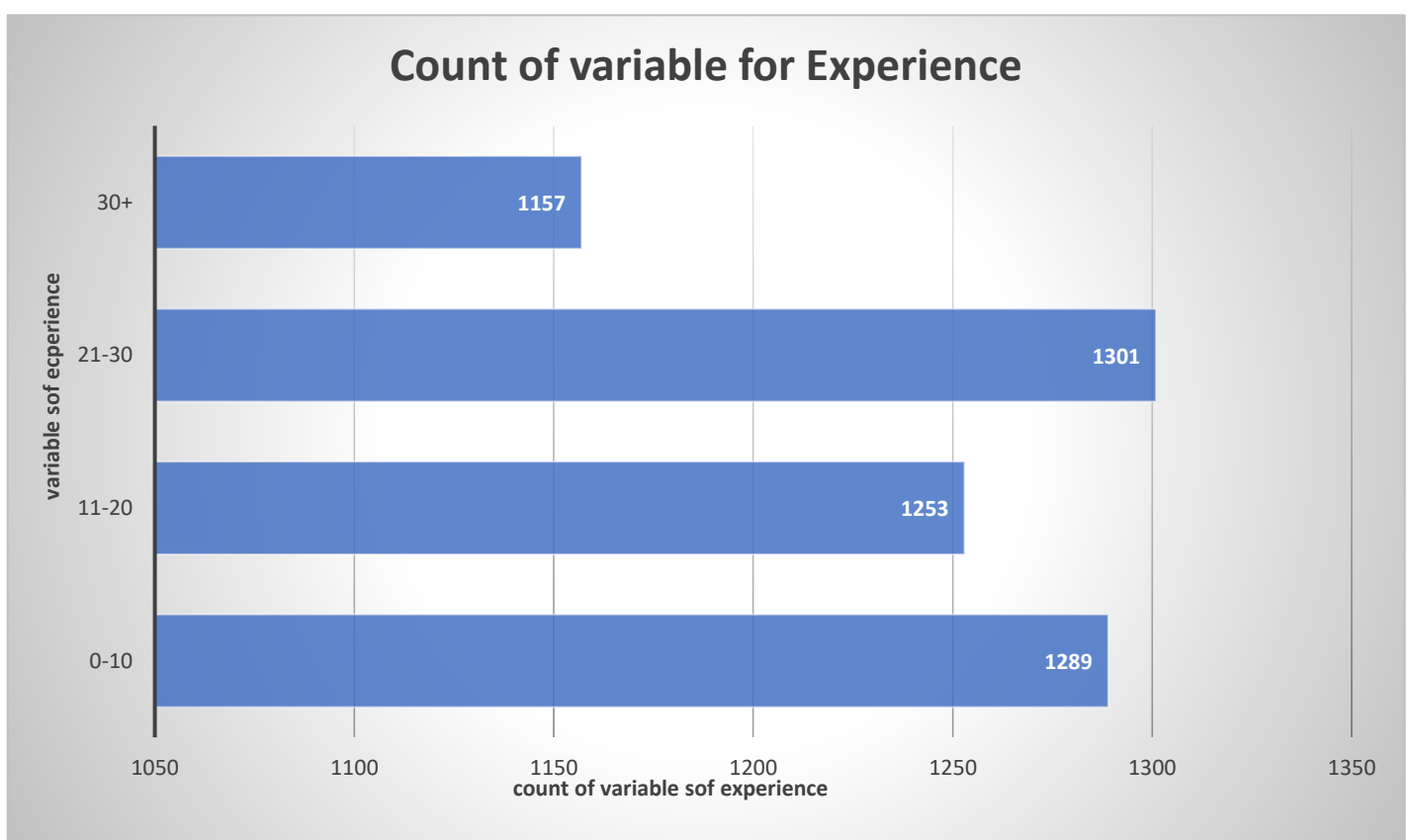
d. 30+ years.

Plot a bar graph for this new categorical variable

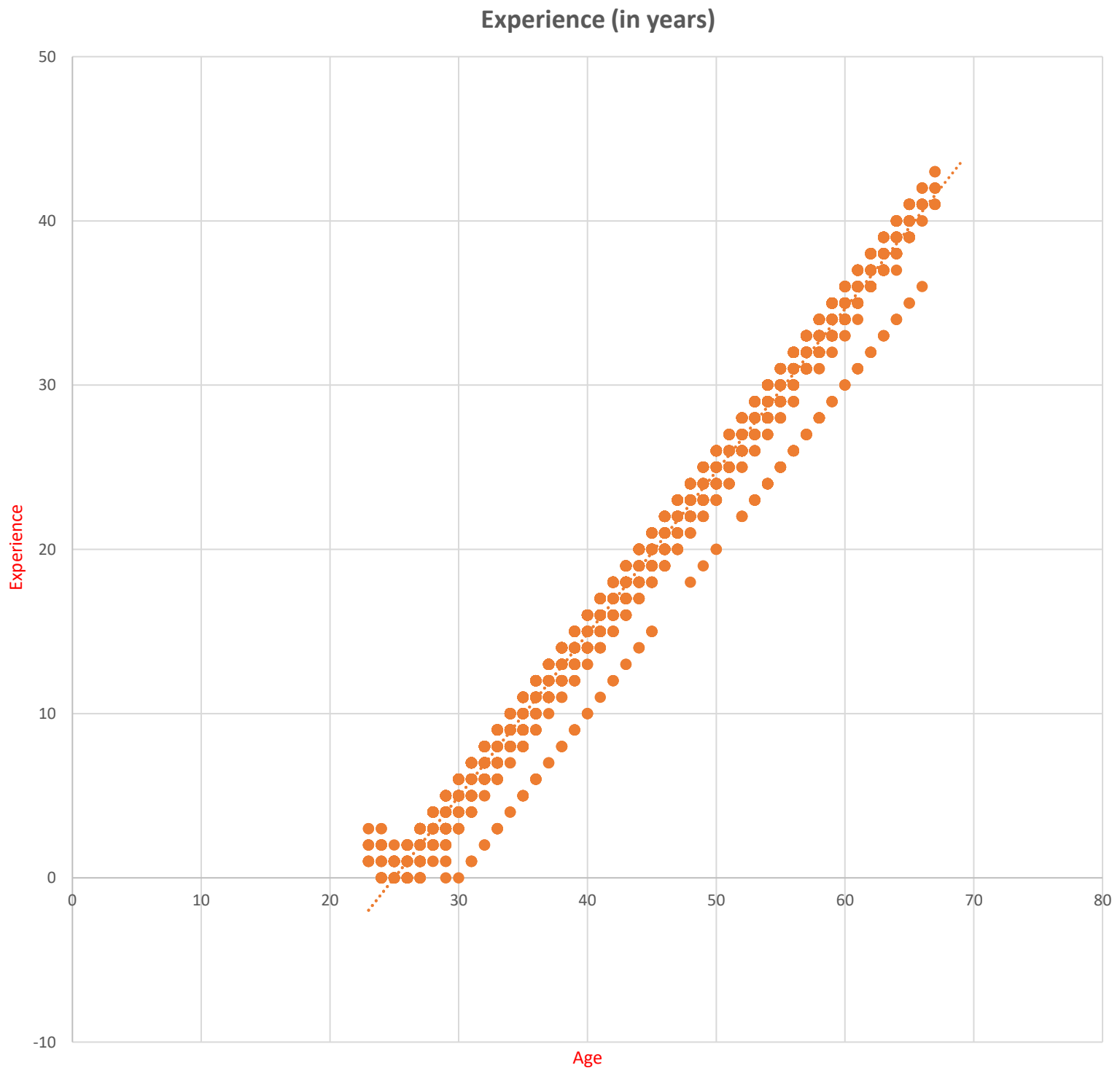
- new categorical variable for Experience using 4 categories created in excel (please refer excel sheet)

(Approach used: - used if function to calculate variables of experience and inserted pivot table, bar chart)

variable for Experience	Count of variable for Experience
0-10	1289
11-20	1253
21-30	1301
30+	1157



**4. Create a scatter plot of the Age and the Experience variable.
What do you observe?**



➤ Observations based on the scatter plot : -

- This is a positive correlation. As the age increases, professional experience of the customer also increases.
- A positive association between age and professional experience would be indicated on a scatterplot by an upward trend (positive slope), where higher age corresponds to higher professional experience levels and lower age corresponds to fewer years of professional experience.
- We can see a strong correlation or positive correlation as data points are close together. As one increases, so does the other, and is shown on the scatter plot line diagram as a line with positive slope.
- As the first variable increases, the second variable increases as well. This corresponds to points (and a line of best fit) that move up as you go from left to right.

(approach used:- inserted scatter plot from the data)

5. What are the top 3 areas (ZIP Codes) where the bank's customers are located?

.	ZIP code	No of customers	
Top-1	94720	169	
Top-2	94305	127	
Top-3	95616	116	

(Approach used: - used pivot table for making zip code and customer id table, used large function to get the top 3 customer's id, used index and match function to get the zip code of the top 3 customer ids)

6. How many customers have a combination of Fixed Deposits and Credit Cards but not Personal Loan?

- There are 147 customers who have a combination of Fixed Deposits and Credit Cards but not Personal Loan

Personal Loan	No
TD Account	Yes
Credit Card	Yes

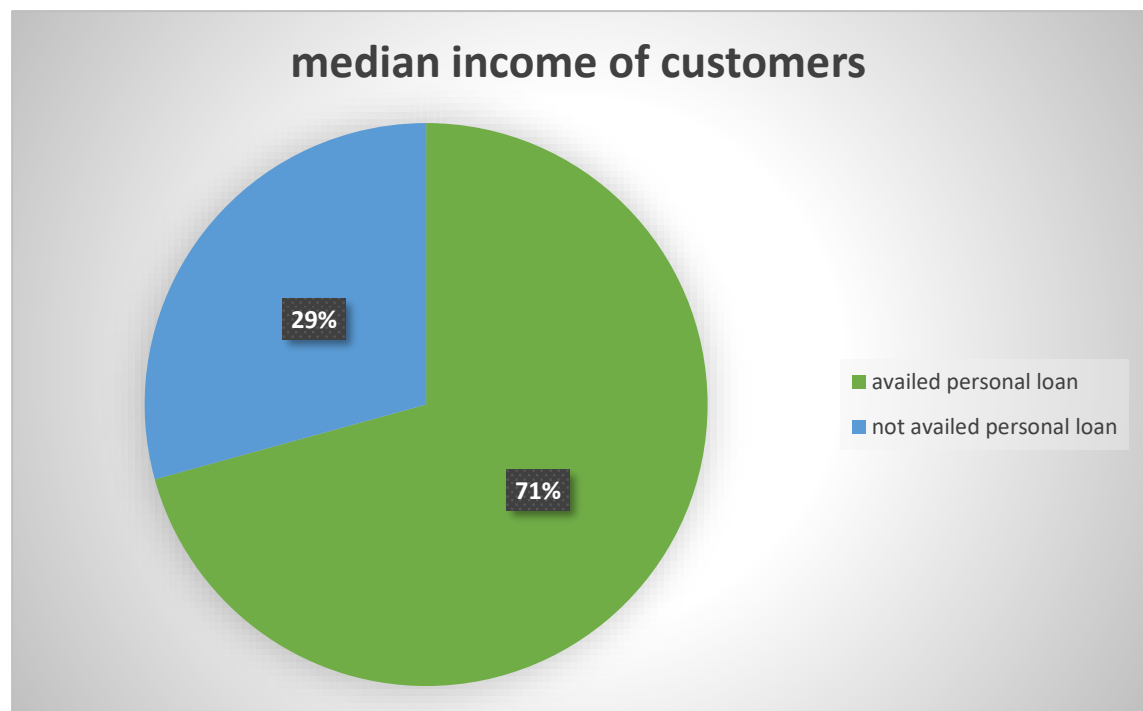
customers

147

(approach used:- used pivot table to get the count of ID)

7. What is the median income of the customers who have availed personal loans and compare it with the median income of those customers who have not availed personal loans? What do you infer?

.	median income
availed personal loan	142.5
not availed personal loan	59



- Income is generally used as a measure of the economic well-being of individuals and communities. Median income provides information about the financial resources available to households, and is closely tied to employment levels, educational attainment, and health.
- The median income is the income amount that divides a population into two equal groups, half having an income above that amount, and half having an income below that amount.
- In this case out of 5000 customers , the median income of the customers who have availed personal loans is \$142.5 that is 71% and the median income of those customers who have not availed personal loans is \$59 that is 29%
- we can see that people who have availed personal have higher median income of almost \$83.5 than compared to people who didn't have personal loans .

(approach used :- used pivot table to get two separate table and used median function to the median of income, and inserted pivot table)

8. Create 4 separate Pivot Tables. Summarise your data by percentages.

- Education vs Personal Loan
- TD Account Vs Personal Loan
- Online vs Personal Loan
- Income Category vs Personal Loan

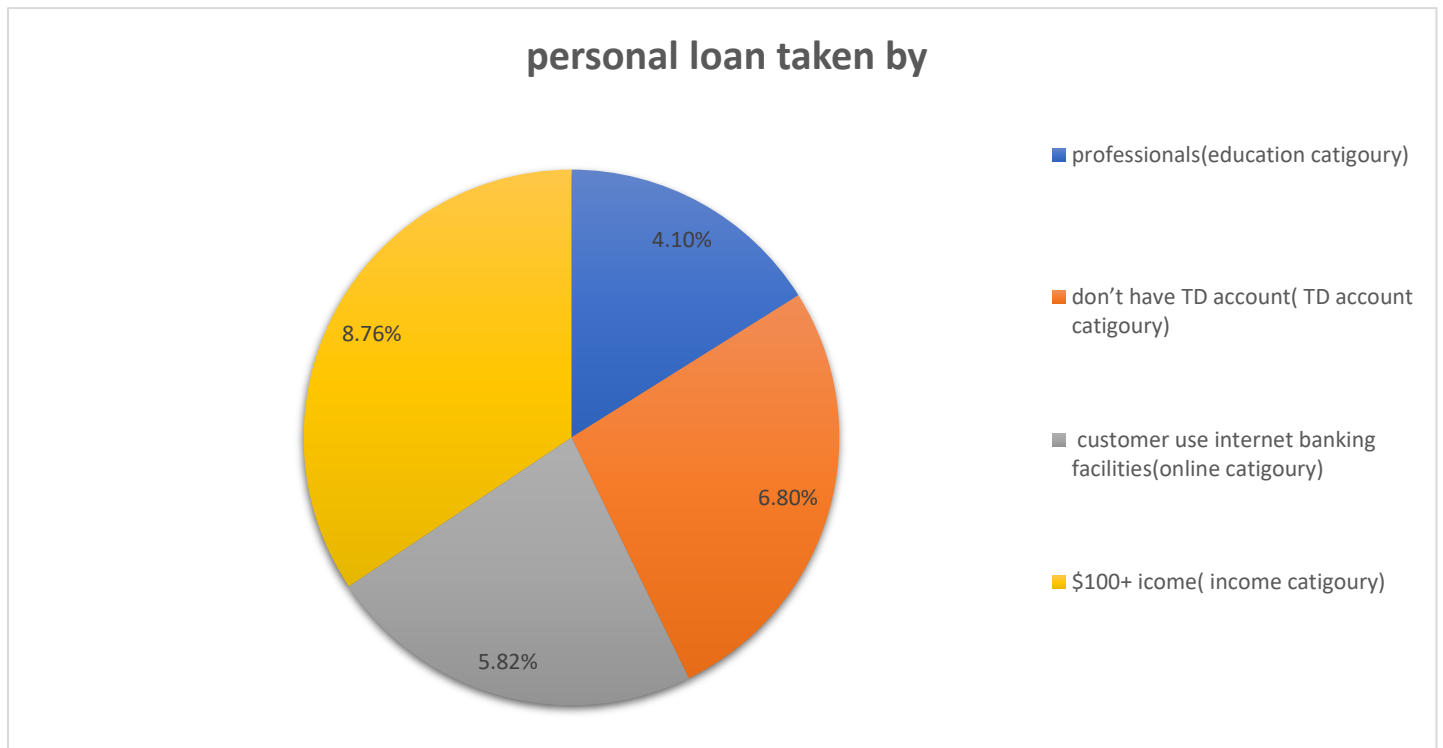
Education vs Personal Loan		personal loan		
education	No	Yes	Grand Total	
Graduate	24.42%	3.64%	28.06%	
Professional	25.92%	4.10%	30.02%	
Undergraduate	40.06%	1.86%	41.92%	
Grand Total	90.40%	9.60%	100.00%	

TD Account Vs Personal Loan		Personal loan		
TD Account	No	Yes	Grand Total	
No	87.16%	6.80%	93.96%	
Yes	3.24%	2.80%	6.04%	
Grand Total	90.40%	9.60%	100.00%	

Online vs Personal Loan		Personal loan		
online	No	Yes	Grand Total	
No		36.54%	3.78%	40.32%
Yes		53.86%	5.82%	59.68%
Grand Total		90.40%	9.60%	100.00%

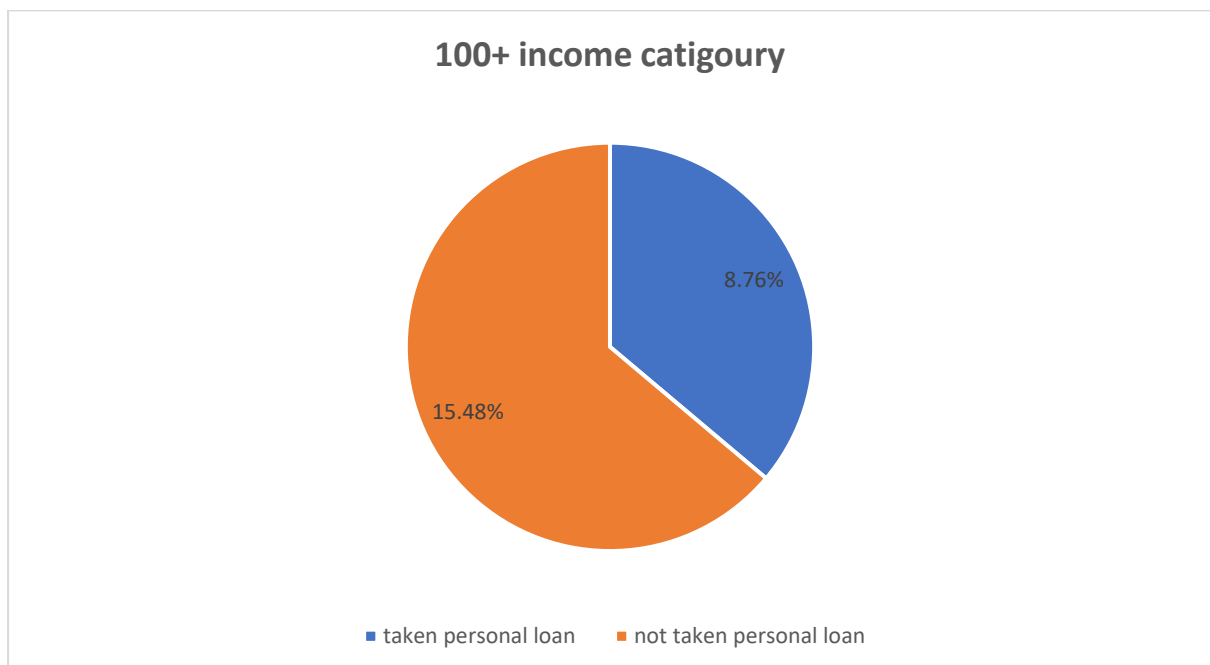
Income Category vs Personal Loan		personal loan		
Income Category	No	Yes	Grand Total	
0-50		38.28%	0.00%	38.28%
100+		15.48%	8.76%	24.24%
51-100		36.64%	0.84%	37.48%
Grand Total		90.40%	9.60%	100.00%

9. Analyse the Pivot tables created in the previous question and state any anomaly that you observe. Which categorical variables appear most important for your further study if you want to analyse which customers are most likely to take personal loans and why?



- In education category professional have taken the highest personal loan, 205(4.10%) professional have taken lone
- In TD account category customer's who do not have TD account have the highest personal loan , 340(6.80%) customers with out TD account have taken personal lone
- In online account category customer's who have online account have the highest personal loan , 291(5.82%) customers with online account have taken lone
- In income variable category customer's who are in \$100+ range category have the highest personal loan , 438(8.76%%) customers with income variable category account have taken lone

According to the above data, income category variable appear most important compared to education , TD account , online because In income category the highest personal loans was taken by 438(8.76%) customers in \$100+ income category



There are chances that out of 774 customers some more customers might take the personal loan compared to other category because there are all kinds of age categories customers from 21-65 and customers from different educational background and they might take lone for their educational purpose , and as they all come under \$100+ income category they might clear their loans on time as they a getting a bit high income category .

(approach used:- used pie charts for visualization of data)

10. In the last campaign, bank reached out to 5000 customers out of which 480 customers accepted the personal loan offer. The bank incurred a huge cost in running a marketing campaign to reach out to so many customers. This is where you as a strategic business consultant step in. You are tasked to optimise the cost of this campaign by identifying the correct target base (without significant reduction in number of acceptance of offers). The bank can then send Personal Loan offers to these target customers who have a higher chance of accepting the offer. Based on your analysis, what strategy would you suggest to the management of HBFC bank?

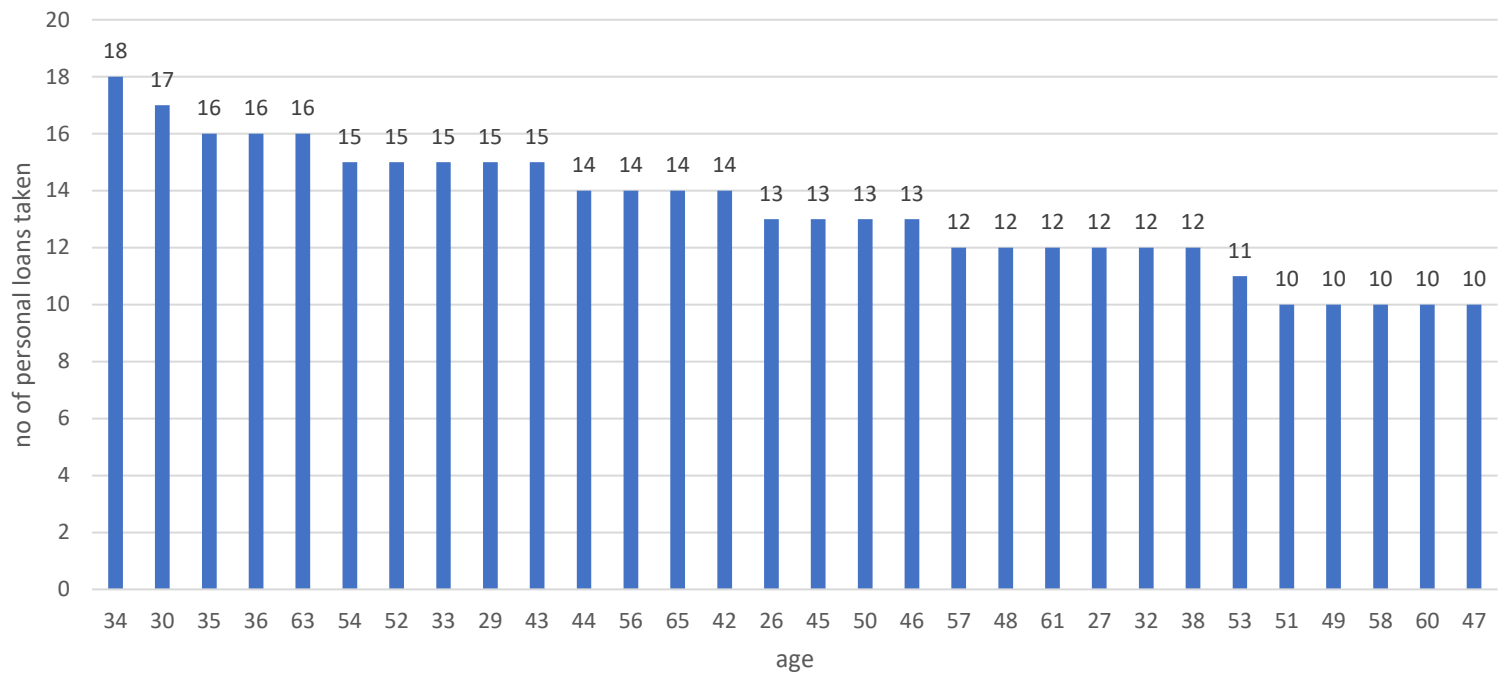
- Based on the analysis The bank can then send Personal Loan offers to these target customers who have a higher chance of accepting the personal loan offer:-

Note:-

Data in charts are arranged according to customers how have taken the highest person loan to lowest and customers who have taken least personal lone have been exempted so that it gives a correct target base to the bank .

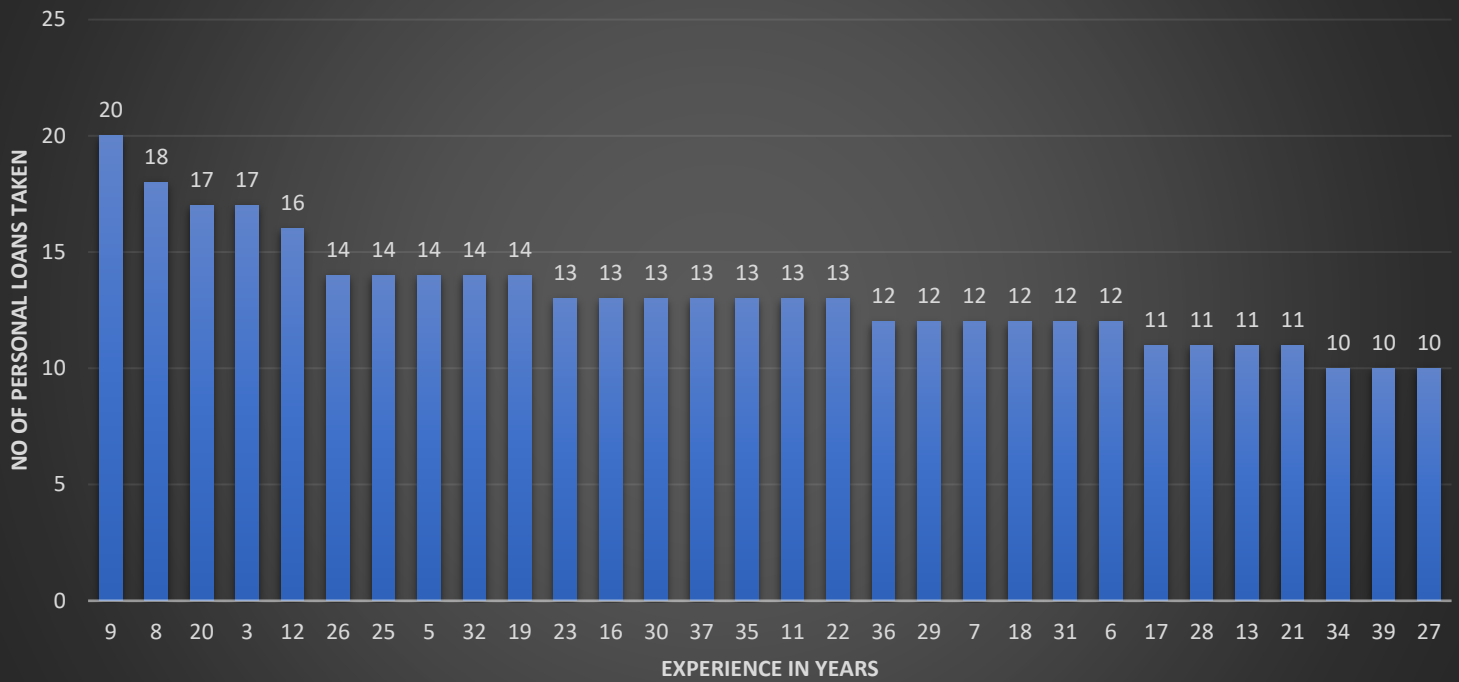
(approach used :- used pivot tables and bar charts and pie charts and sorting function to analyse the data)

- Age wise target customers



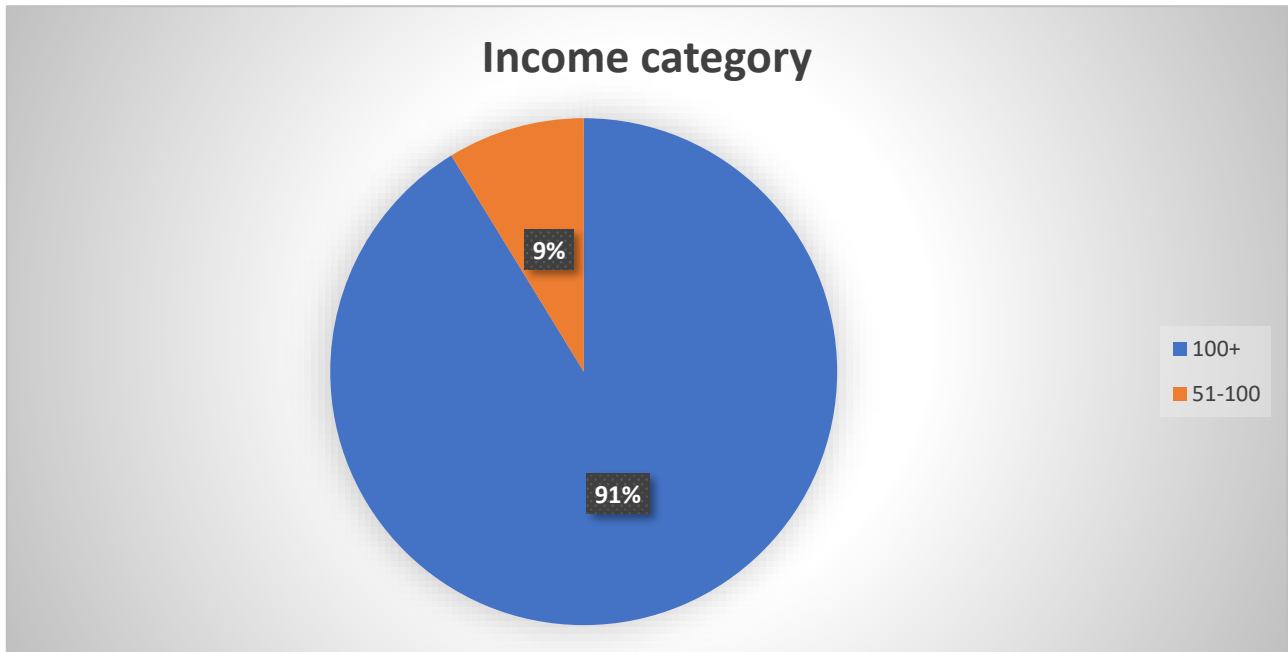
The bank should target the above age category people because they have the most high rate of taking person loans . This age category people have taken 399 loans out of 480. In this category.

- Experience wise target customers



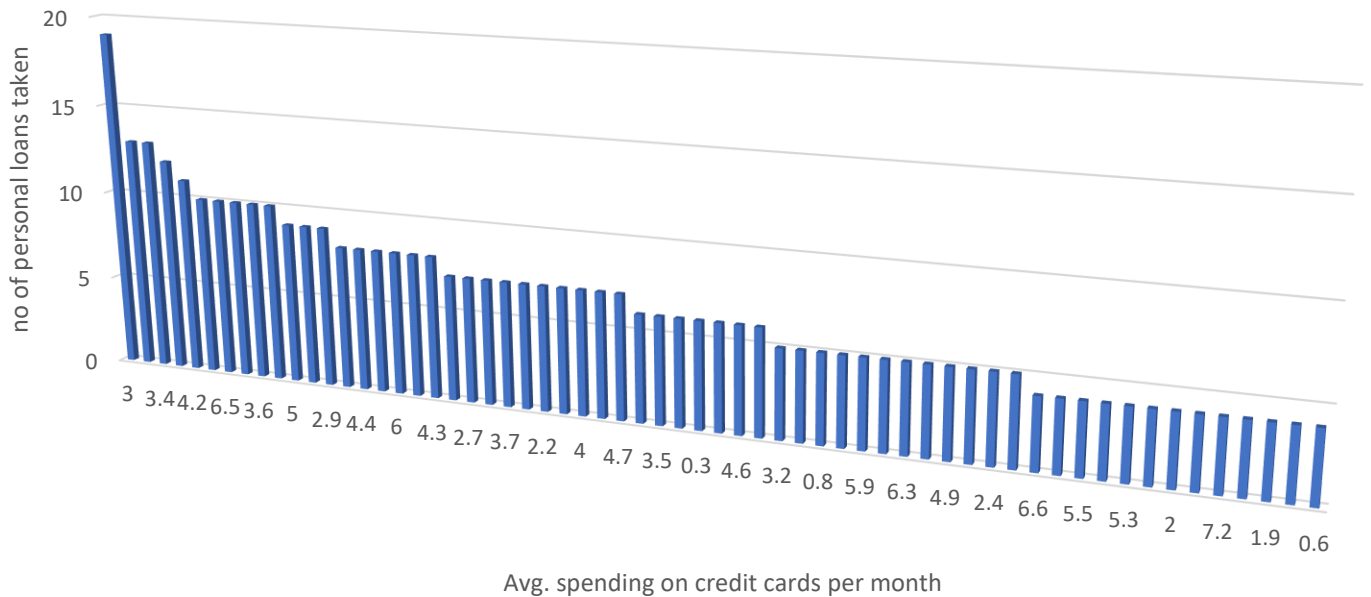
The bank should target the above professional experience category people because they have the most high rate of taking person loans . This professional experience category people have taken 395 loans out of 480. In this category

- Income category wise target customers



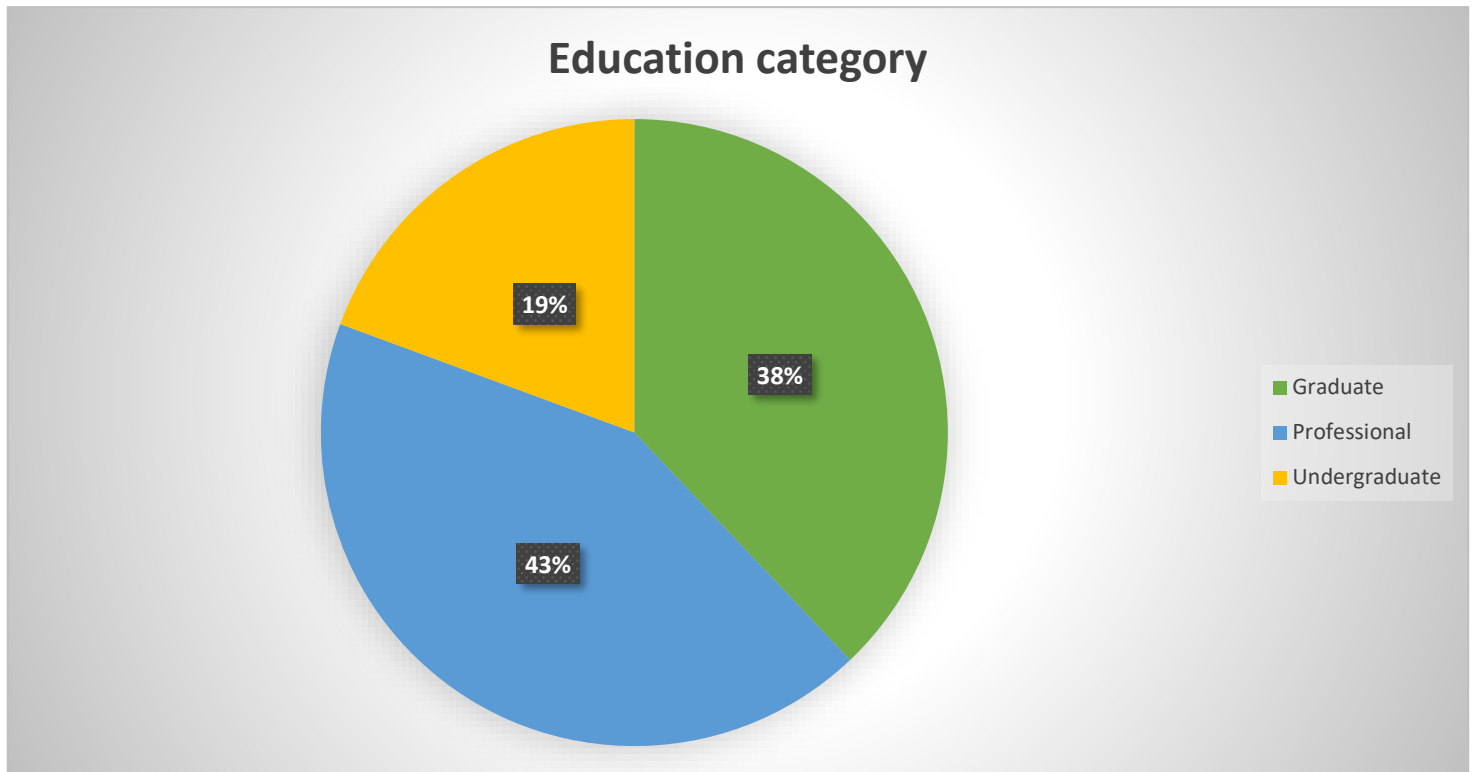
In income category the bank should target \$100+ category people because they have the most high rate of taking person loans . \$100+ income category people have taken 438 loans or 91% loans out of 480.

- Average spending on credit card category wise target customers



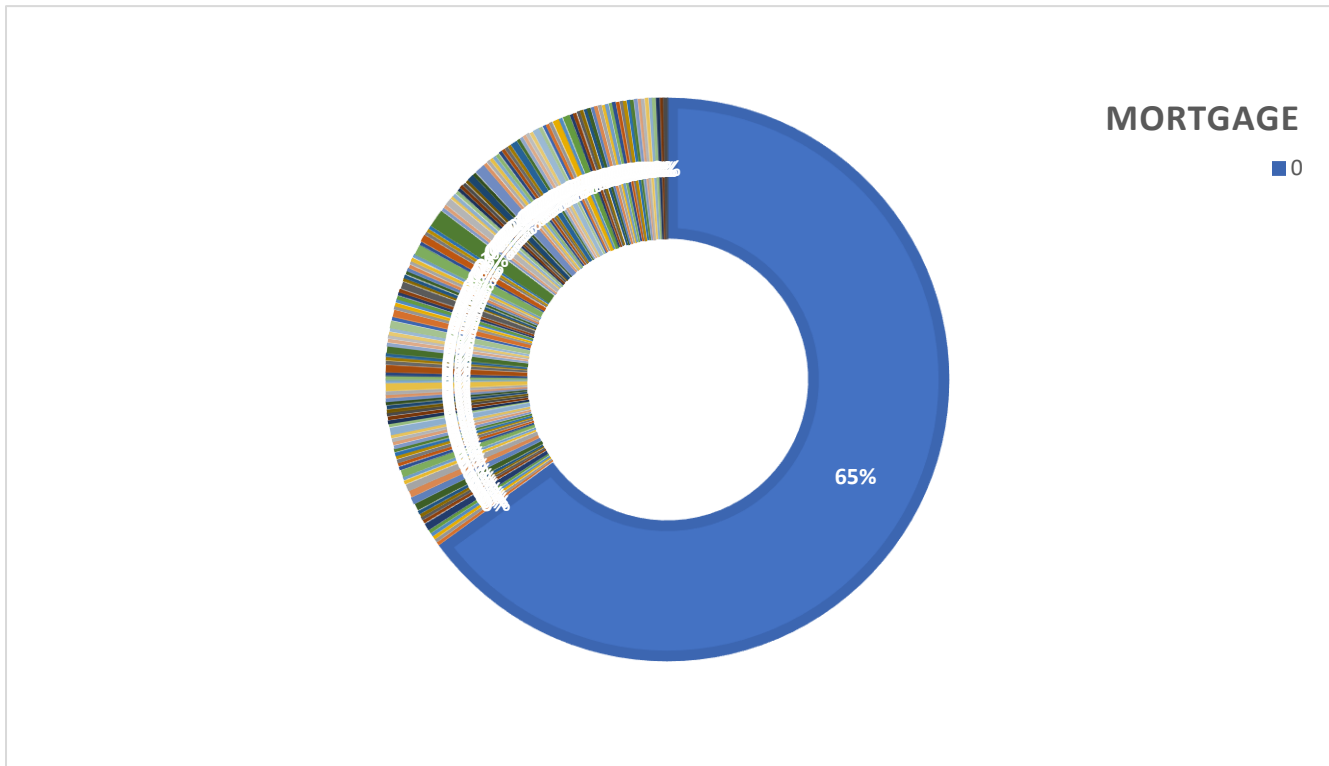
In Avg. spending on credit cards per month category the bank should target these category people because they have the most high rate of taking person loans . This Avg. spending on credit cards per month category people have taken 417 loans out of 480

- Education category wise target customers



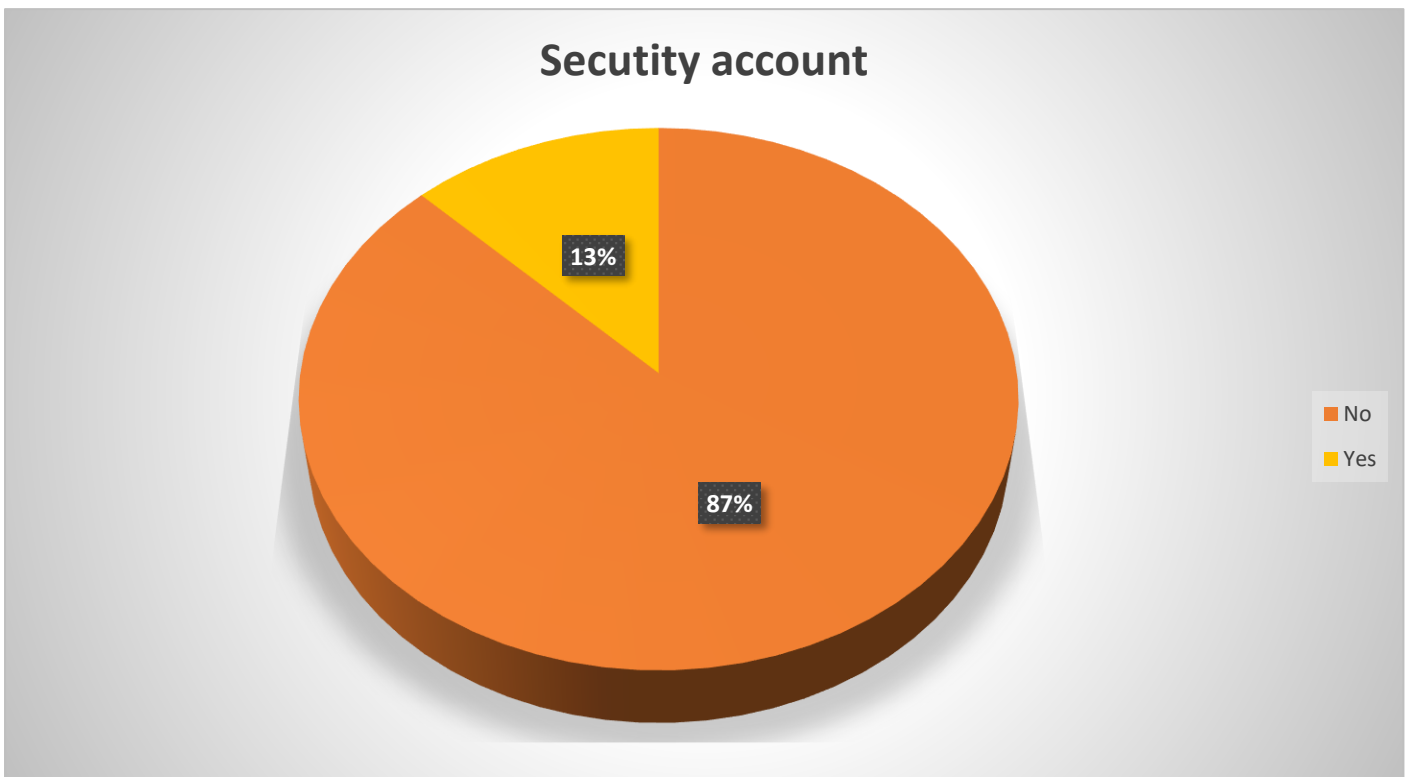
In Education Level category the bank should target mainly professional customers who take taken 205(43%) loans and second they should target graduates who have taken 182(38%) of personal loans as these category customers have the most hight rate of taking person loans .

- mortgage category wise target customers



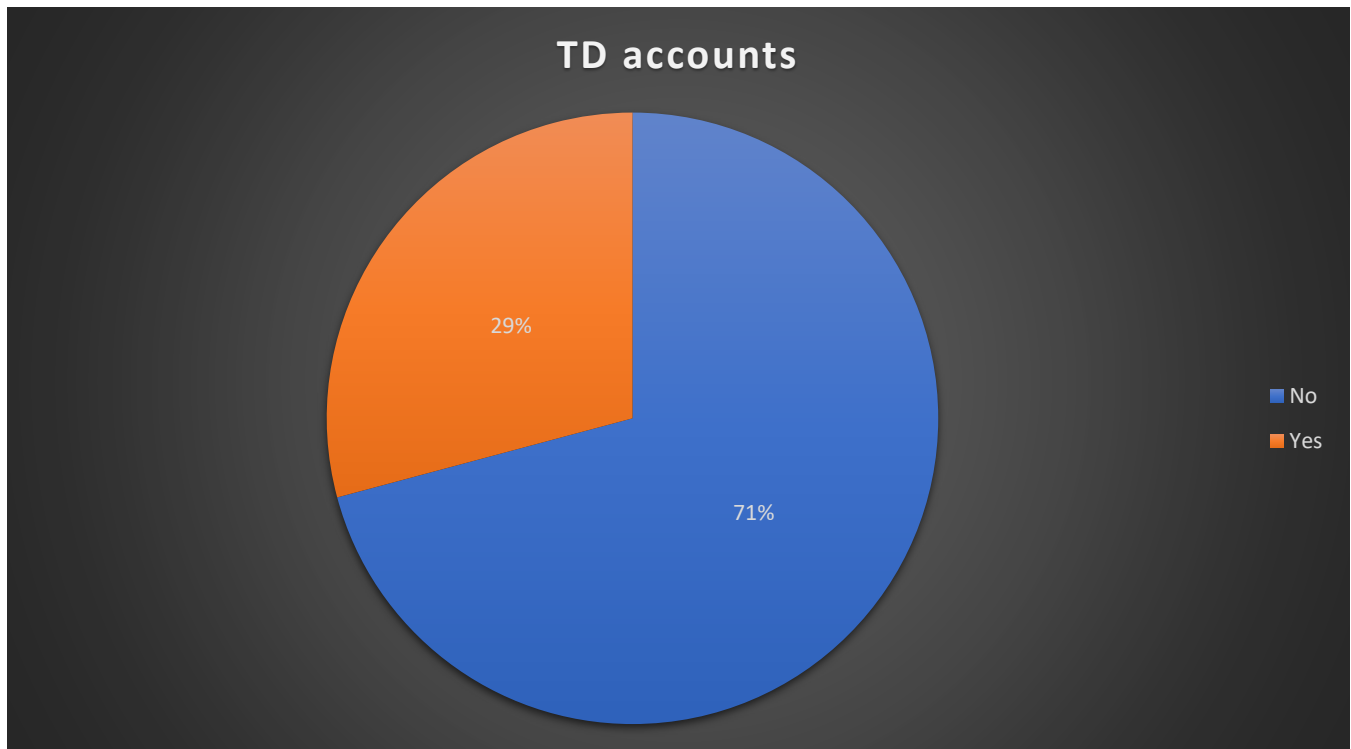
In mortgage category the bank should mainly target customers who have 0 mortgage . 312(65%) personal loans has been taken by 0 mortgage customers taken.

- security account category wise target customers



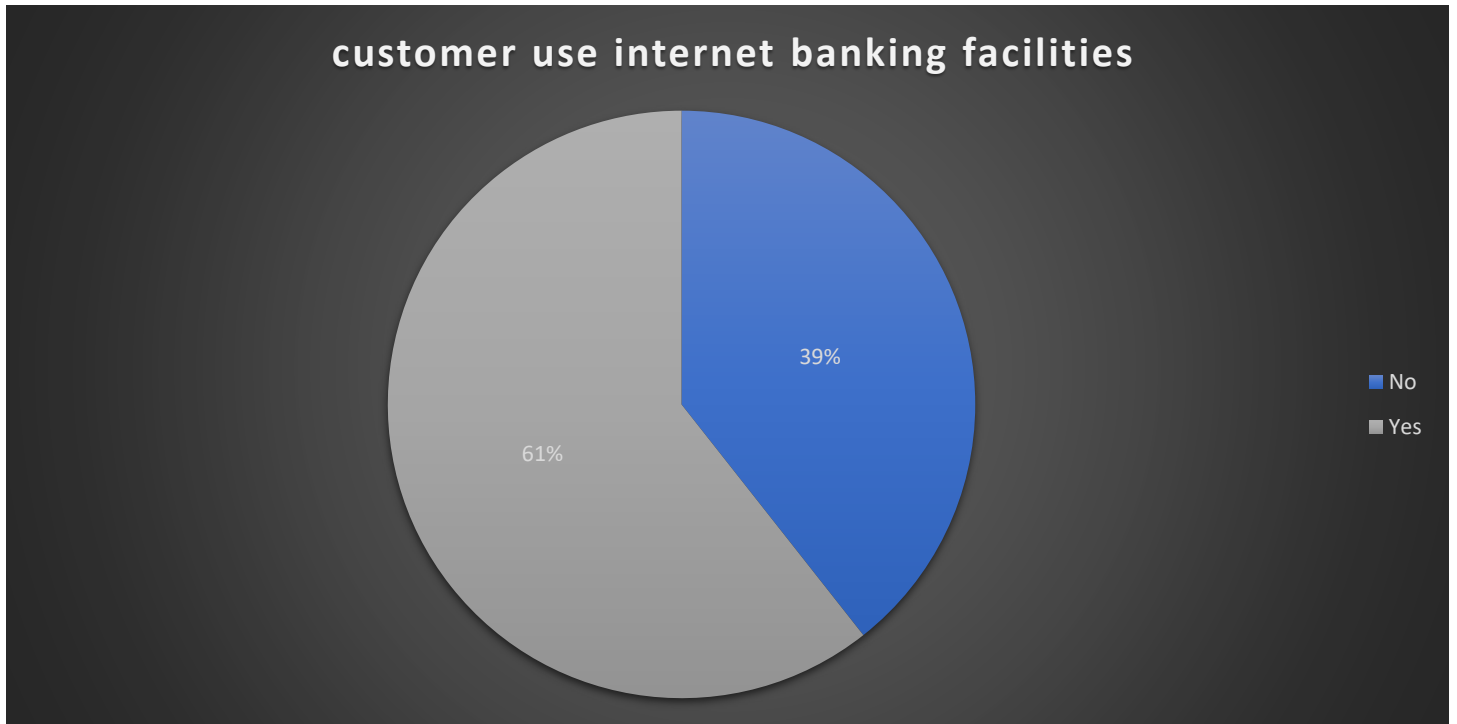
In security accounts category they should target mainly customers who don't have security accounts in the bank . 420(87%) personal loans has been take by customers who don't have security account.

- TD account category wise target customers



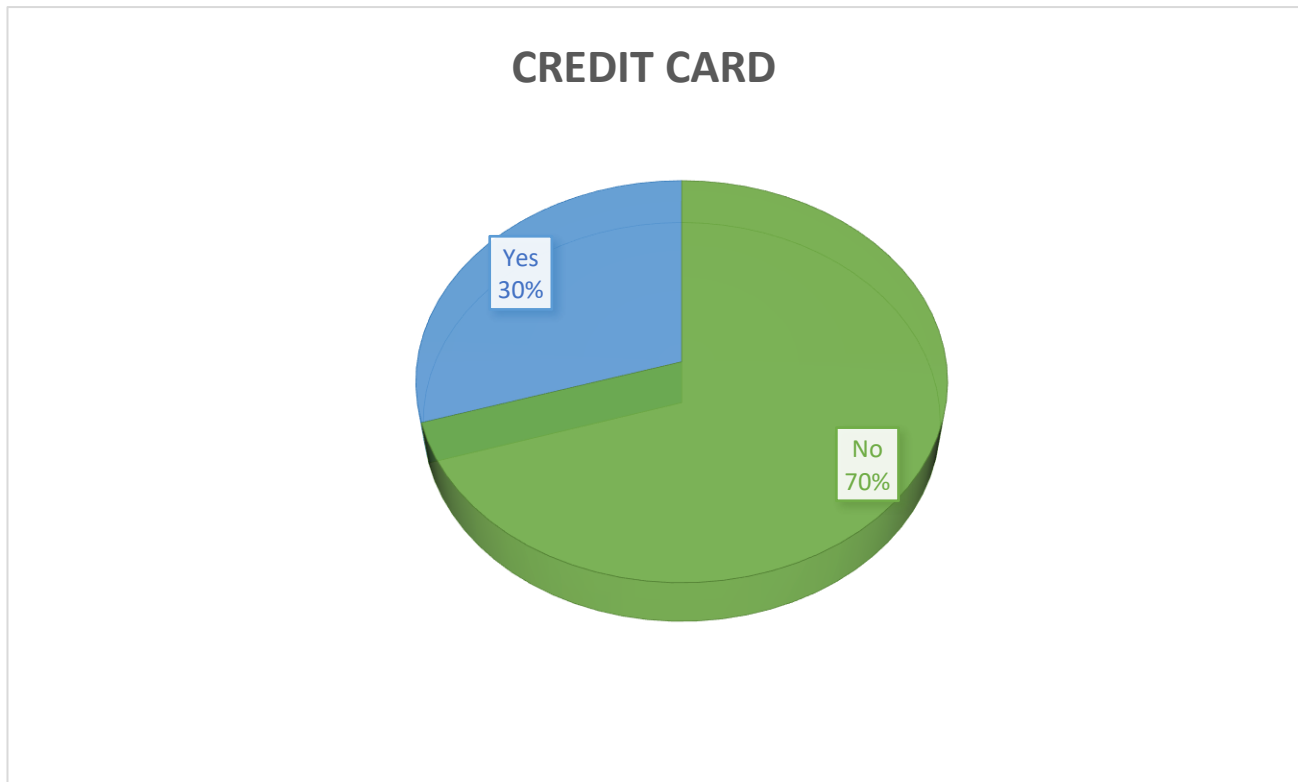
In TD accounts category they should mainly target customers who don't have TD accounts in the bank . 340(71%) personal loans has been take by customers who don't have TD account.

- Online category wise target customers



In online category bank should target mainly customers who use internet banking facility of the bank . 219(61%) personal loans has been take by customers who use internet banking facilities .

- Credit card category wise target customers



In credit card category bank should target mainly customers who don't use a credit card issued by the bank . 337(70%) personal loans has been take by customers who don't use a credit card issued by the bank.

❖ Suggestion to the management of HBFC bank

- Based on the analysis The bank can then send Personal Loan offers to the above targeted customers, who have a higher chance of accepting the personal loan offer based on the research.
- Getting lower interest rates and low processing fees on loans will encourage the interest of the customers and will make it easier for them to consider availing a loan. So, these festive offers can help people get the loans that suit their needs.
- Provide special educational loan offers to students
- Provide special offers and deals to customers on use of bank credit card
- Optimize mobile banking websites
- Monitor Online Reviews.
- Get Creative with Social Media Posts.
- Update Your Mailing Lists to Support Your Loan Advertisement Ideas.
- Email Marketing.
- Use Direct Mail.
- Offer new customers discounts and promotions.
- Ask for referrals from old and loyal customer's

- Recontact old customers.
- Network.
- Update your website.
- Partner with complementary businesses.
- Promote your expertise.
- Take advantage of online ratings and review sites.