

Project: HBFC Bank (Personal Loans)

Data Dictionary: The data consists of the following variables (columns).

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?

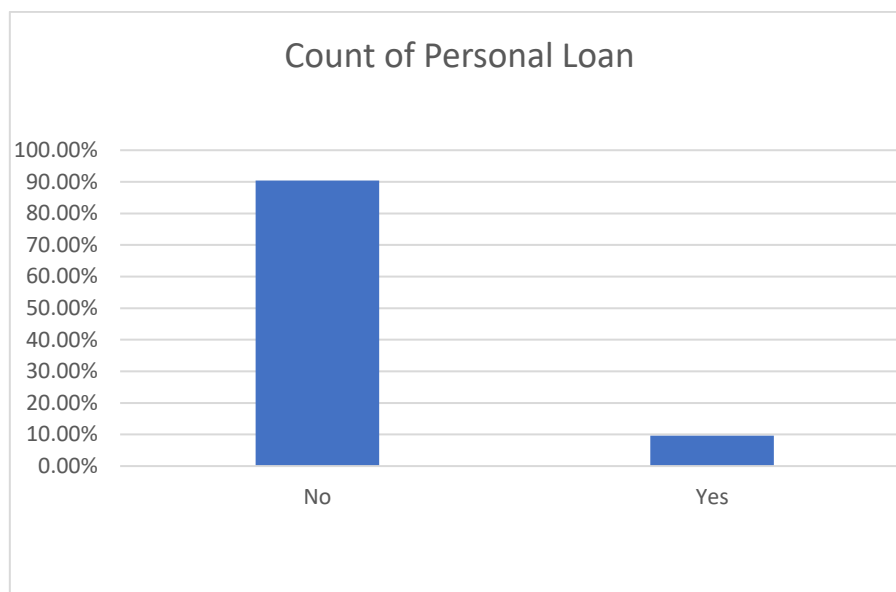
Credit Card: Does the customer use a credit card issued by the bank?

Question 1)

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

Answer)

Personal Loan	Count of Personal Loan
No	90.40%
Yes	9.60%



9.60% of bank's customers have availed Personal Loans.

Question 2)

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

Answer)

Age (in years)		Experience (in years)		Income (in K/year)	
Mean	45.3384	Mean	20.1348	Mean	73.7742
	0.16211		0.16143078		0.65101
Standard Error	4	Standard Error	3	Standard Error	5
Median	45	Median	20	Median	64
Mode	35	Mode	32	Mode	44
Standard	11.4631		11.4148801	Standard	46.0337
Deviation	7	Standard Deviation	5	Deviation	3
	131.404		130.299488		2119.10
Sample Variance	2	Sample Variance	9	Sample Variance	4

			-		
			1.14451425		
Kurtosis	-1.15307	Kurtosis	8	Kurtosis	-0.04424
			-		
			0.00996583		0.84133
Skewness	-0.02934	Skewness	6	Skewness	9
Range	44	Range	43	Range	216
Minimum	23	Minimum	0	Minimum	8
Maximum	67	Maximum	43	Maximum	224
Sum	226692	Sum	100674	Sum	368871
Count	5000	Count	5000	Count	5000

<i>FamilyMembers</i>	
Mean	2.3958
Standard Error	0.01619756
Median	2
Mode	1
Standard	
Deviation	1.145340439
Sample Variance	1.311804721
	-
Kurtosis	1.397617207
Skewness	0.157748774
Range	3
Minimum	1
Maximum	4
Sum	11979
Count	5000

<i>CCAvg</i>	
Mean	1.937938
Standard Error	0.024716
Median	1.5
Mode	0.3
Standard	
Deviation	1.747659
Sample Variance	3.054312
Kurtosis	2.646706
Skewness	1.598443
Range	10
Minimum	0
Maximum	10
Sum	9689.69
Count	5000

<i>Mortgage</i>	
Mean	56.4988
Standard Error	1.43845
Median	0
Mode	0
Standard Deviation	101.7138
Sample Variance	10345.7
Kurtosis	4.756797
Skewness	2.104002
Range	635
Minimum	0
Maximum	635
Sum	282494
Count	5000

- Average customers are of age 45, maximum age is 67 years and minimum age is 23 years
- 43 years' experience is the highest experience amongst the customers who has bank account in this bank
- 20 years old is the average age of the customers who has the bank account.
- Customers who have bank account and having 8k income per year is the least amongst all the customers and 224k per year is the highest earnings amongst the customers in the bank.
- Average number of people in each customers family are 2 and maximin is 4.
- More than half of the people have not taken the loan

Question 3)

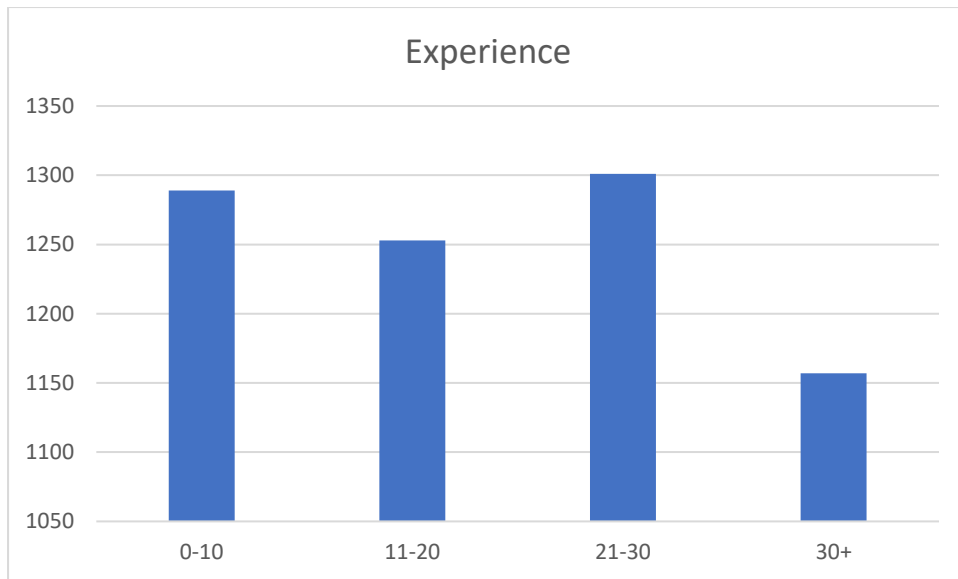
Create a new categorical variable for Experience using 4 categories

- 0 to 10 years
- 11 to 20 years
- 21 to 30 years and
- 30+ years.

Plot a bar graph for this new categorical variable

Answer)

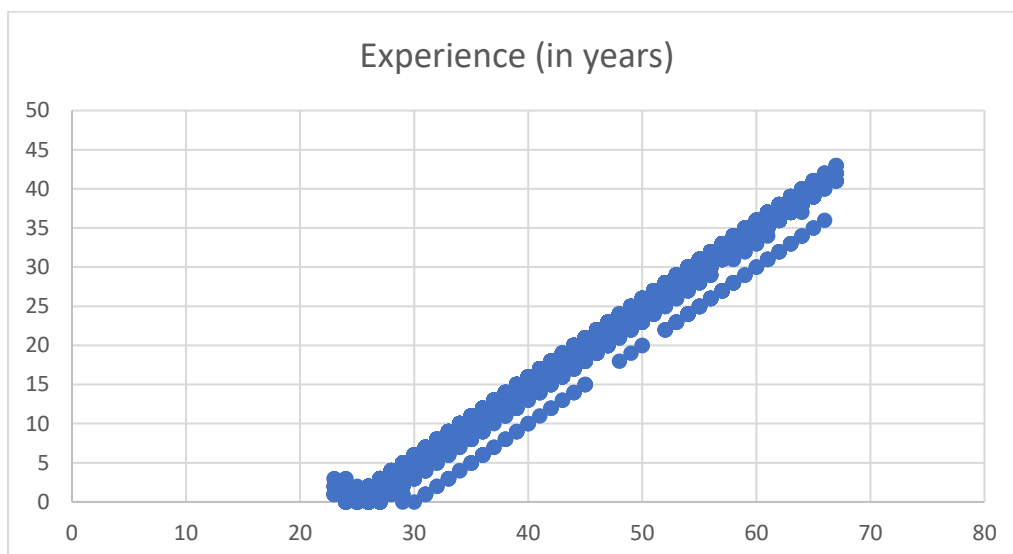
Experience	Count of ID
0-10	1289
11-20	1253
21-30	1301
30+	1157



Question 4)

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

Answer)



Here according to the data it's a positive relationship, as the age increases accordingly experience also increases. Which means aged persons has high experience.

Question 5)

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

Answer)

Top 3 Zip codes count

94305	127
94720	169
95616	116

Question 6)

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

Answer)

Using COUNTIFS

=COUNTIFS(Table1[[#All],[CreditCard]],"Yes",Table1[[#All],[TD Account]],"Yes",Table1[[#All],[Personal Loan]],"No").

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

Question 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?

Answer)

customers who have availed personal loan

<i>income(K/year)</i>	
Mean	144.6886
Standard Error	1.507935
Median	142
Mode	130
Standard Deviation	31.63071
Sample Variance	1000.502
Kurtosis	-0.79069
Skewness	-0.23434
Range	143
Minimum	60
Maximum	203
Sum	63663
Count	440

customers who have not availed personal loan

<i>income(k/year)</i>	
Mean	66.23739

Standard Error	0.603569
Median	59
Mode	44
Standard	
Deviation	40.57853
Sample Variance	1646.617
Kurtosis	0.797101
Skewness	1.029026
Range	216
Minimum	8
Maximum	224
Sum	299393
Count	4520

Customers whose income is high, more likely got the personal loans as compared to people who are not having high income. And there are a smaller number of people who are having personal loans and they have high income.

Question 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

Answer)

Education vs Personal Loan

Count of Education	Column Labels		
Row Labels	No	Yes	Grand Total
Graduate	87.03%	12.97%	100.00%
Professional	86.34%	13.66%	100.00%
Undergraduate	95.56%	4.44%	100.00%
Grand Total	90.40%	9.60%	100.00%

13.66% of customers who are taken Personal loan are Professionals and followed by Graduates with 12.97%.

TD Account Vs Personal Loan

Count of TD Account	Column Labels
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Row Labels	No	Yes	Grand Total
No	92.76%	7.24%	100.00%
Yes	53.64%	46.36%	100.00%
Grand Total	90.40%	9.60%	100.00%

46.36% of customers who are having TD account has taken the personal loan

Online vs Personal Loan

Count of Online	Column Labels		Grand Total
Row Labels	No	Yes	Grand Total
No	90.63%	9.38%	100.00%
Yes	90.25%	9.75%	100.00%
Grand Total	90.40%	9.60%	100.00%

The percentage of Customers who have taken the personal loan in online and offline are almost similar that is 9.75% and 9.38%.

Income_Category vs Personal Loan

Count of Income Categorical	Column Labels		Grand Total
Row Labels	No	Yes	Grand Total
0-50	100.00%	0.00%	100.00%
100+	63.86%	36.14%	100.00%
51-100	97.76%	2.24%	100.00%
Grand Total	90.40%	9.60%	100.00%

Customers who have <=50K income, have not got the personal loans and 36.14% of Customers who has >100K income has got the personal loan.

There are only 2.24% customers who are having 51K to 100 K income have got the personal loan

Question 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?

Answer)

- Customers who are having 100+ K income has more chances of getting personal loan.
- Customers who are having professional education have taken more personal loan as compared to Graduates and Undergraduates.

- Customers can opt online or offline for getting the personal loan, as of now there are similar % of people who are getting personal loans in online and offline.

Question 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?

Answer)

Out of 5000 customers 480 customers have got the personal loan. These customers who are likely Professionals and are having TD accounts. And also, these customers have income of 100K+. New Customers who are coming under these categories can get the personal loan.

STAR Analysis

Situation:

HBFC Bank (Personal Loans)

If the customers of HBFC Bank are taking personal loans then the bank will get more profit. I, as a consultant is supported to help the HBFC Bank to retain the high performance of the Bank.

Task:

Understanding key characteristics and attributes of customers who have offered and not offered personal loans.

Action:

Data: we have attributes about customers like ID, age, income, loan(Y/N), education family, Zip code, credit card etc.,

Descriptive Analysis:

- 9.60% of bank's customers have availed Personal Loans.
- Average customers are of age 45, maximum age is 67 years and minimum age is 23 years
- 43 years' experience is the highest experience amongst the customers who has bank account in this bank
- 20 years old is the average age of the customers who has the bank account.

- Customers who have $\leq 50K$ income, have not got the personal loans and 36.14% of Customers who has $>100K$ income has got the personal loan.
- There are only 2.24% customers who are having 51K to 100 K income have got the personal loan
- Customers who have bank account and having 8k income per year is the least amongst all the customers and 224k per year is the highest earnings amongst the customers in the bank.
- Average number of people in each customers family are 2 and maximin is 4.
- More than half of the people have not taken the loan
- 13.66% of customers who are taken Personal loan are Professionals and fallowed by Graduates with 12.97%.
- There is a positive relationship between age and experience, as the age increases accordingly experience also increases. Which means aged persons has high experience.

Recommendations:

According to the Data, out of 5000 customers 480 customers have got the personal loans. These customers who are likely Professionals and are having TD accounts. And also, these customers have income of 100K+ per year.

These types of Customers who are eligible for personal loans are more targeted.