BUSINESS INTELLIGENCE AND VISUALIZATION

MBA-4043B

CIA - II

Business Intelligence Mini Project on Bank Customers Data

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By

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Business Intelligence and Visualisation in Banking Sector

Introduction to Business Intelligence

BI can be defined as an ability of an enterprise to comprehend and use information in order to increase the performance. By using BI systems, companies are supported in making their business-critical data and processes transparent and intelligent. Also, employees will be able to make better decisions, achieve the required results faster, and continuously develop them. Another advantage of BI systems is that companies can make their customer and supplier relationships even more profitable, reduce costs, minimize risks and increase added value. Without the use of BI systems, enormous amounts of data are available, but then they spread confusion and ultimately complicate business.

Business Intelligence in Banking Industry

Business Intelligence in banking industry is the key achievement in making the fundamental business activities effective and efficient. It has the capacity in getting, overseeing, and breaking down the information of clients, products, services, operational activities, suppliers, and partnerships in an enormous number.

Business intelligence in business activities can give customized customer services and fundamentally increases the service quality from the bank. For instance, client credit scoring analysis using business intelligence models the risk potential from loan application aides in decision making process with decreased operational expense and time. Thus, usage of business insight in client division makes it simpler to distinguish clients and manage them based on demography.

BI applications in Banking:

1. **Risk management:** Detection and prediction of fraud is very important issue because in case of credit card fraud, bank is liable for the damage. Models for prediction of credit card holder's behavior can issue an early warning of card theft and minimize bank's losses.
2. **Selling of additional products to additional customers:** Banks try to maximize the marketing return on investment by exploiting cross-sell and up-sell opportunities because

a cost of selling to an existing customer is about five times lower than cost of attracting and winning a new customer from the competition. However, prior to selling of products it is advisable to estimate the probability of sale's closing. Estimating probability in advance has two fold benefit. Lowering the marketing campaign costs having a high response rate, and, more importantly, raising the quality of customer relations.

3. **Reducing Churn rate:** Loosing a customer to competition is a major issue in all ventures. In immersed markets, potential outcomes of development are looked for through wining a new customer from competition. Customers change to competition in view of engaging offers and advantages. Credit card companies constantly bring down their interest rates to attract new customers. The brought down rates are applied during initial period of usage, with an expectation that the client, adequately happy with company's services, will continue to use products without discounted rate. BI strategies can evaluate a likelihood that customer will churn or stop transactions after the discounted period.
4. **Segmenting:** Banks use traditional segmentation of customers in retail and commercial banking. Banks' products and offers are made to be appealing to various customer segments This customary division plans can obscure a view to genuine customer practices. Enormous measure of information about their customers banks can use for analysis of client social highlights. Information from socio-demographic and accounting databases together with consumer loyalty studies information got from a CRM framework can be effectively mined to segment profitable client**.** The BI innovation can distinguish new, already obscure, client sections, which would then be able to be focused with bank's specialized offerings. This improves the conventional division approach and enlarges bank's productivity.
5. **Client Lifetime Value -** Client lifetime value management anticipates income from every client later on period. For instance, it might be fascinating to attract university students who will, in the end, become faithful and productive clients. Bank's income produced on student's accounts and services might be moderate yet fabricating a decent customer relationship makes great possibilities for what's to come. The BI can build models for expected client lifetime value, so that bankers can treat clients accordingly, taking into account client's profitability, not the current, but as a whole.

6. **Activation -** Activation models gauge likelihood that another client is really going to utilize a recently specified product or service and become profitable. For instance, a customer that signed a life insurance may neglect to make instalments. Or on the other hand, another credit cardholder doesn't utilize their new Mastercard. Financial products become profitable after initiation, which is after being utilized. There is a small number of customers that never enact, and activation models distinguish such customers. Banks would then be able to contact these customers and stimulate them to activate with special bonuses or offers or can simply cease to provide them the service.

PROBLEM STATEMENT

The business environment in which we operate is very dynamic in nature. Any changes in the economy has two-fold impact. Economy operates freely only when there is high liquidity, demanding jobs in economy, no inflation and various other factors.

The problem statement of this project is to analyse the savings of customers across multiple regions to derive insights like which region saves more among which age category. The problem statement motivates us to segregate the data under various geographical regions, job classification, age and visualize the same data using various statistical visualization tools.

OBJECTIVES

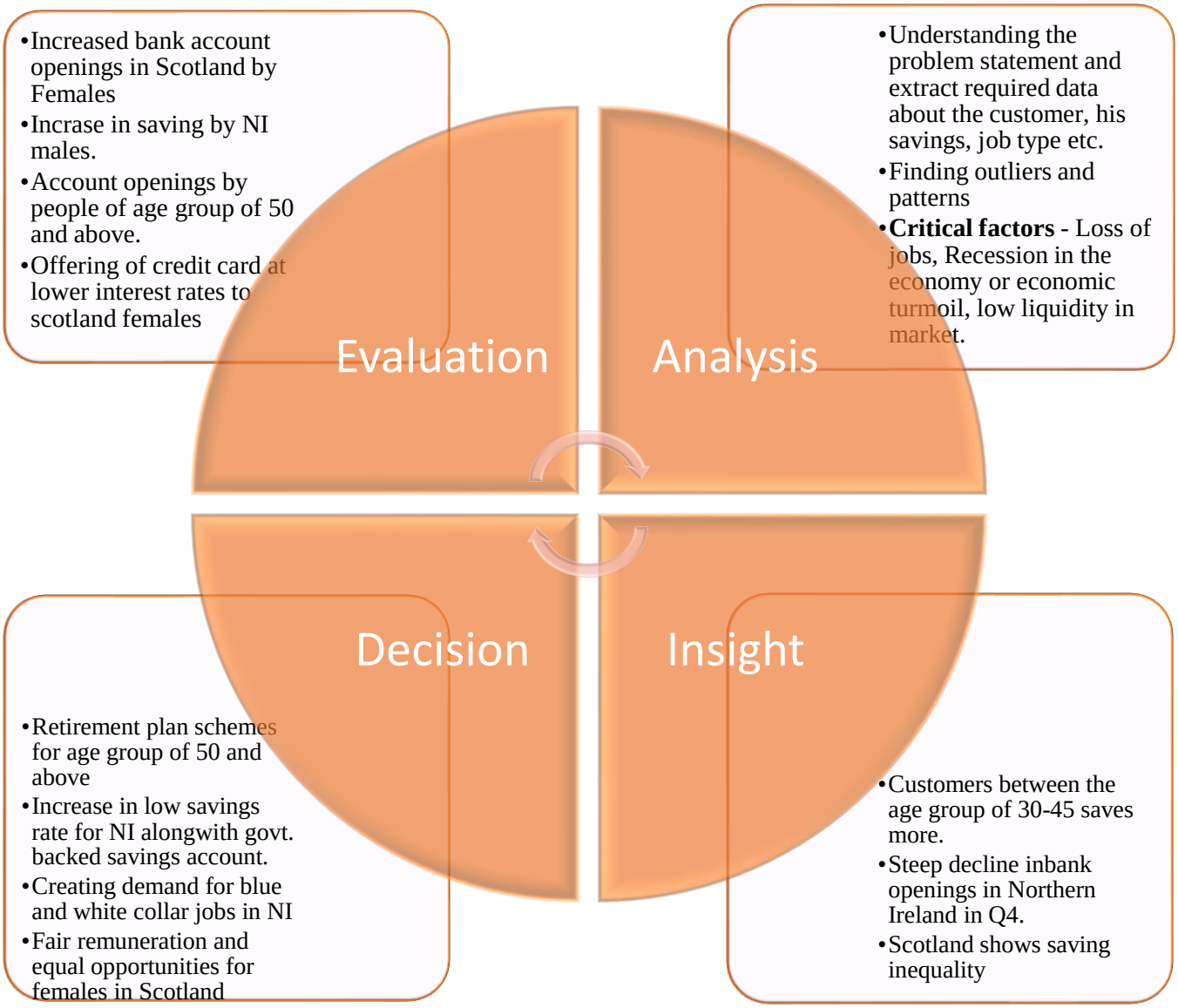
1. To analyse the saving pattern across various age category and gender distribution.
2. To analyse savings across region and job classification.
3. To analyse savings across age, gender, and region wise distribution.
4. To analyse the data on a temporal range of quarterly basis.

ABOUT THE DATASET

The data selected for this project was sourced from Kaggle.com. **Source -** https://www.kaggle.com/ukveteran/uk-bank-customers . The dataset comprises of UK bank

customers with 4015 observation/rows and 9 Columns. Columns include Customer Id, Name, Surname, Gender, Age, Job Classification, region, date Joined and Balance in customer's account. For our visualization not all variables were used. Some of the important variables that were used to perform visualization were Gender, Age, Balance, Region, Date Joined and Job Classification. Data selected for this project was cleaned organized

CYCLE OF BUSINESS INTELLIGENCE



STAR SCHEMA

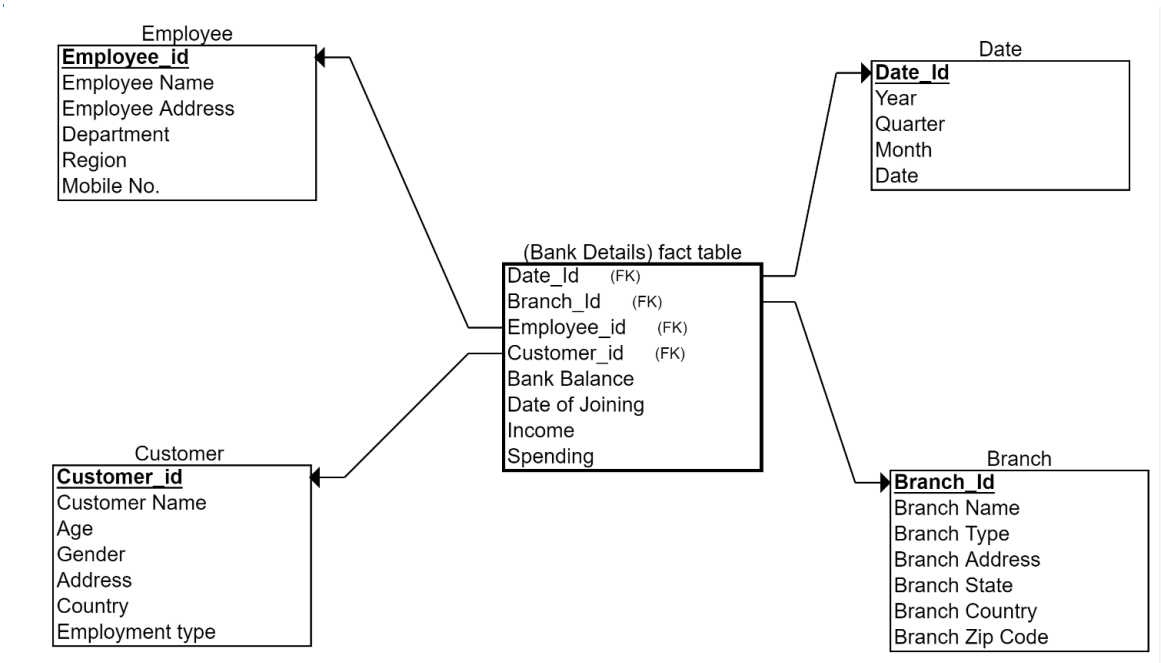


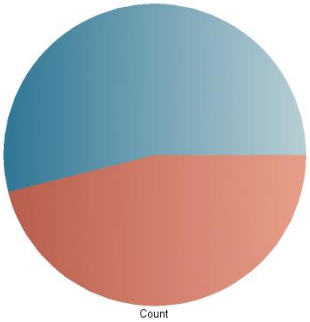
Fig. Schema Diagram for Bank Customers

A star schema is generally prepared to get quick responses to our queries. The fact table contains the attributes which can be counted or measured and is connected to the dimension table whereas a dimension includes reference data about the fact table. In the bank customers dataset, the fact table measures details by using metrics such as bank balance of a customer, date when the customer opens the account, Income of a customer, and how much is the spending of the customer. The dimension table of the schema includes the various dimensions or the entities of the organization and helps to come up with valuable BI models. Here the dimension table consists of Customers, Employee, Branch and Date. All these dimensions describe the granularity of the information that can be retrieved and help to draw valuable insights.

COGNOS INSIGHTS

- **Gender Wise Distribution**

% of total for the	Count
Total of Gender	100.00%
Male	53.94%
Female	46.06%

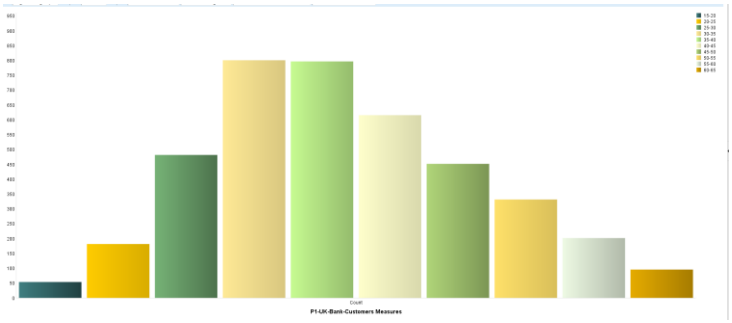


	Count
Total of Gender	4,014
Male	2,165
Female	1,849

Above pie chart represents the gender distribution. Out of 4014 customers 53% are male whereas 46% represents Female customers.

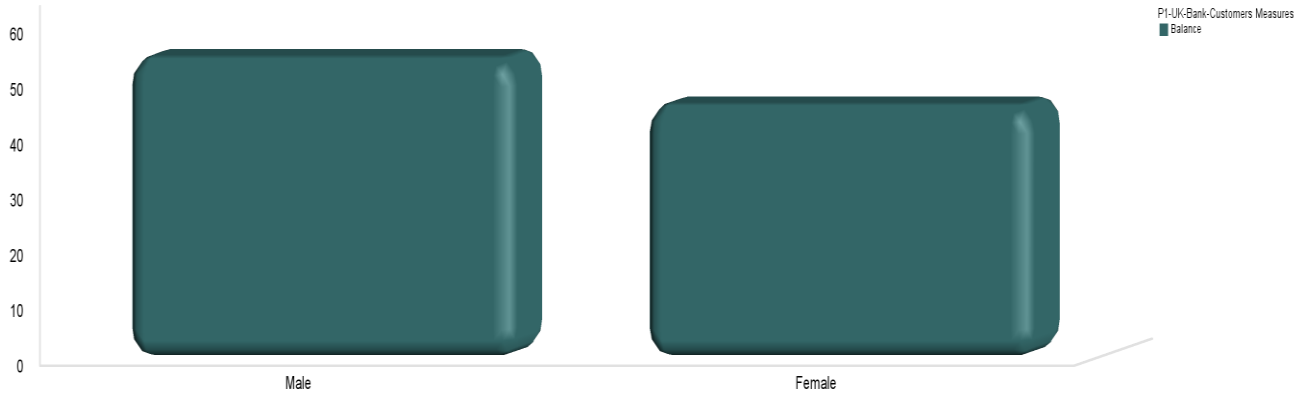
- **Age Distribution**

It represents the savers in age category. We see that number of people who save more are between the age group of 30-45.



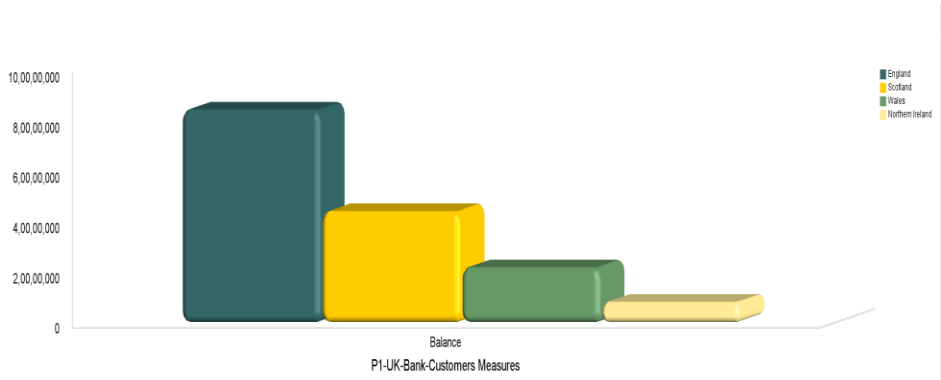
	Count
Total of Age Category	4,014
15-20	54
20-25	182
25-30	482
30-35	801
35-40	797
40-45	616
45-50	452
50-55	332
55-60	202
60-65	96

- **Gender wise savings distribution**



The above graph represents that Males have more savings than females.

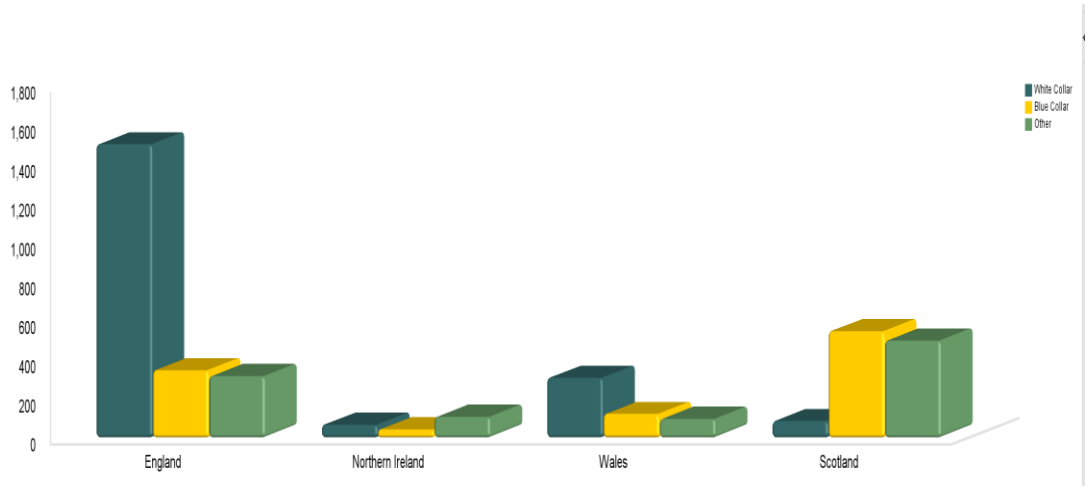
- **Region wise savings distribution**



% of total for the column	Balance
Total of Region	100.00%
England	53.15%
Scotland	27.82%
Wales	13.81%
Northern Ireland	5.22%

The above graph tells us that England has the highest savings whereas Northern Ireland has the least. We can say that England and Scotland have more savers than other regions.

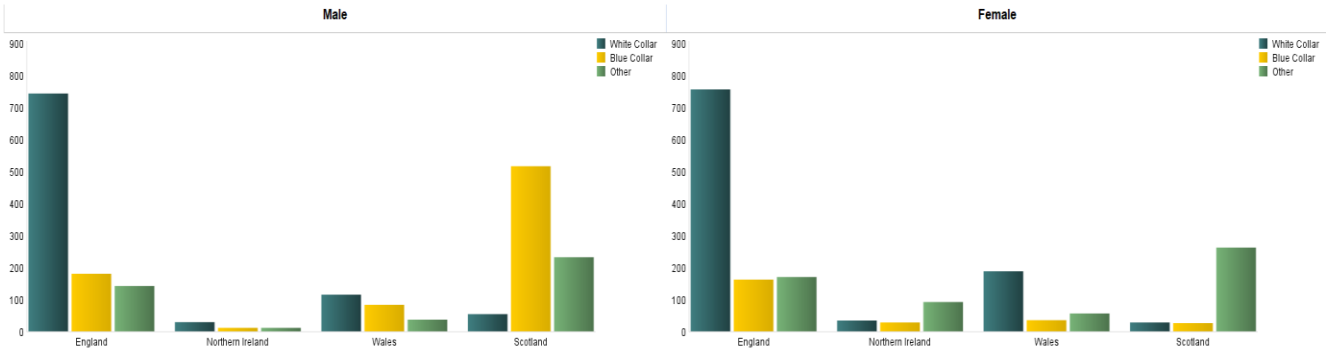
- **Region Wise Job Classification**



	Total of Region	England	Northern Ireland	Wales	Scotland
Total of Job Classification	4,014	2,159	211	520	1,124
White Collar	1,955	1,501	65	305	84
Blue Collar	1,049	344	41	120	544
Other	1,010	314	105	95	496

1. England shows a greater number of White-collar jobs and Scotland shows more of blue collar jobs and Other jobs.
2. Northern Ireland shows Other job classification which can be considered as low paid jobs because in the previous graph Northern Ireland have lowest savings.

➢ Job Classification as per Gender and Region



1. In Scotland Blue Collar males are more than Females
2. In Northern Ireland Females are more in “Other Job Classification” as compared to Males.

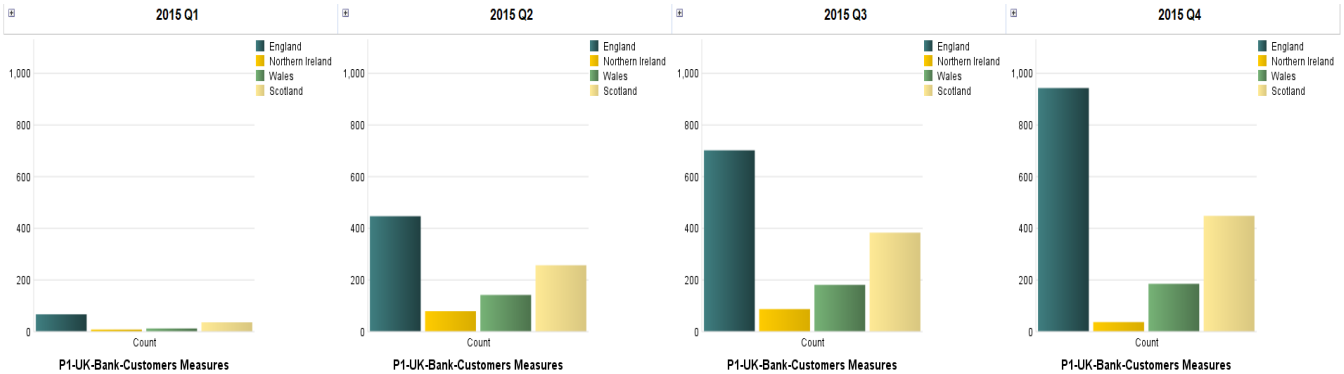
➢ Age wise Gender and Region distribution

Total of Age Category	Total of Gender	England	Northern Ireland	Wales	Scotland
		2,159	211	520	1,124
20-25	Male	54	6	11	5
	Female	62	25	19	
30-35	Male	290	13	63	25
	Female	298	38	64	10
45-50	Male	77		16	192
	Female	73	4	19	71
35-40	Male	272	10	61	42
	Female	295	26	74	17
40-45	Male	169	3	46	115
	Female	172	10	50	51
55-60	Male	1		1	128
	Female	3	1	2	66
50-55	Male	15		2	217
	Female	16	2	3	77
25-30	Male	175	18	33	5
	Female	162	38	44	7
15-20	Male	15	4	5	3
	Female	9	12	6	

Graph for the same values is plotted in cdd file

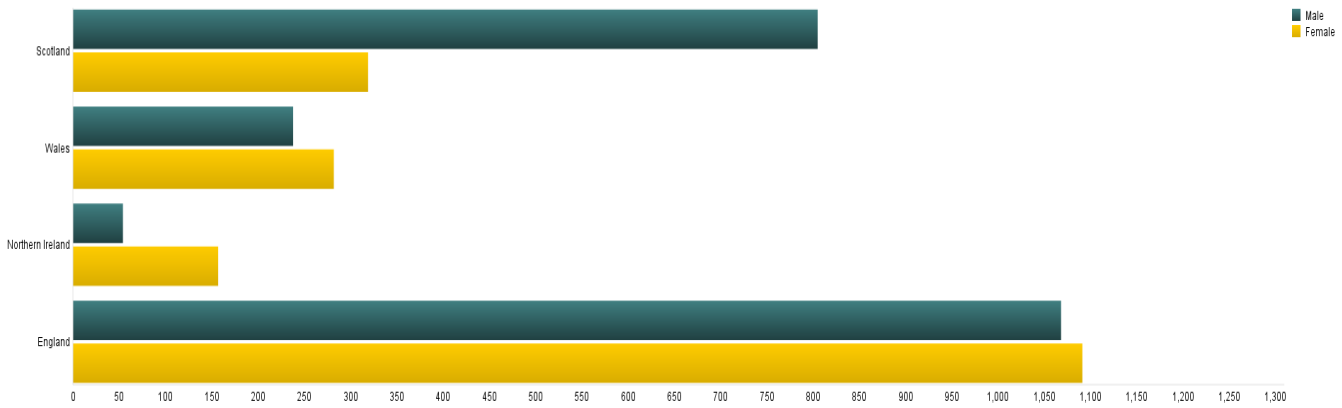
1. In England Female show greater number of bank accounts than male especially between age category of 30-45
2. In Scotland Males bank accounts are more than females especially for the age bracket of 40-55.
3. Only 211 people have bank accounts in Northern Ireland and Females show more bank opening in Northern Ireland as compared to Male.

➢ Quarter and Region Wise Analysis



1. **England** – In England opening of bank accounts by customers increased in every quarter.
2 **Northern Ireland** (NI)– In Northern Ireland initially till Q3 there were opening of bank accounts but in Q4 bank account openings declined sharply from 87 in Q3 to 37 in Q4 especially in November and December
3 **Wales** – Initially in Q1 there were only 12 account openings but after that it increased and in Q4 they had 185 bank openings.
4 **Scotland** – Scotland also showed an increase in bank account opening throughout the year.

- **Gender wise Savings in each Region**



In Northern Ireland Females save more whereas in Scotland there is a huge saving inequality been shown where Male save more than Females.

FINDINGS, CONCLUSIONS AND SUGGESTIONS

Findings

The findings of the analysis done on bank customers dataset are as follows:

- We saw majority of people between age group of 25-50 shows more number of account openings than the remaining age brackets. This is probably because of huge disposable income in hands. Younger people will be looking to put money towards large items such

as a car, home or travel whereas those aged over 65 have not only had time to build their savings, but also are more likely to have no unsecured debt, and to own a property outright.

- In Northern Ireland there was a steep decline in bank account opening in Q4 because of highly publicised manufacturing job losses that Norther Ireland suffered during Q4. Because of job losses it could be inferred that people won't have savings and no motivation for them to open a bank account.
- In Scotland there is a huge demand for blue collar jobs because blue collar jobs require manual labour. These jobs are often both physically and psychologically demanding and have been linked with various adverse health outcomes. In this "state-of-the-field" review, we find that research on the health of blue-collar women over the past quarter century generally suggests that blue-collar women experience worse health than blue-collar men or women in other occupational classes. Therefore, there are more blue collar jobs for male than females.
- In Scotland Males save more than Females because of gender pay gap in Scottish labor market. The pay gap which is difference between men's and women's average hourly pay is the key indicator of women's labor market inequality. The cause of the pay gap and structural barriers to women's equal labour market participation include:
    1. Occupational segregation
    2. The "undervaluation" of women's work
    3. Biased and untransparent recruitment, development, and progression practices.
    4. Discrimination embedded within pay and grading system which results in women being paid less than men for doing equal work.
    5. Lack of quality part time and flexible working which results in women's under-representation at management level and in senior grades.
- In Northern Ireland male save less than female because of changing economic inequality. Various reasons could be pertained to these changes They are:
    1. Economic changes that affect the structure of relative earnings such as globalisation and technological change
    2. Changes in the shape of the labour market such as the growth in part-time or temporary work and self-employment.

3. Demographic change, such as ageing populations and the rise of single adult households.
4. The changing level and nature of income redistribution by governments

- England demands for more white collar jobs than other job classification because of modernisation and technological upgradation also white-collar worker has a more well-rounded education than the blue collar worker.

Suggestions

From the above findings following are the measures that could be taken to incentivise bank openings in United Kingdom

1. Northern Ireland's low savings rate could be increased, with policy options including government-backed saving account design or automatic deductions in a similar manner to pension contributions.
2. Frame financial policies such as retirement plans for age group of 50 and above to make their future secure. This way they will get consistent earnings even after their retirement. Such savings will help them when they get older, the importance of having some form of savings for an emergency, or unforeseen circumstances becomes clearer. Planning for the long-term becomes of higher importance as we age.
3. Reducing gender inequality in Scotland and incentivise women to save more by giving equal and fair pay to women, flexible working hours and fair opportunities to prove themselves at management level.
4. Creation of blue and white collar jobs in Northern Ireland either by setting up new manufacturing units or service industry and increasing the employability skills of customers.

Conclusion

After doing detailed analysis various strategies can be framed to incentivise savers by offering them low interest credit card. The emergence of concept of BI tools help managers in making effective and efficient decision making.

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