

In the first worksheet titled 'SUMMARY', I have summarized the contents from the problem statement in a tabular manner in order to help me with referencing as well as simplifying the question and understanding it in a numerical way. In G16:H18, unitary method was used to find how many international participants use up 1% of the server. This was needed to find how many international participants will cause the server to work at max capacity which was required to be found to know the year when a new server is to be installed.

Since it is given that straight line depreciation is used, the depreciation value is found in C6 by subtracting the salvage value from that of infrastructure then dividing it by the tenure.

In 'AFTER TAX INCREMENTAL CASHFLOW', first a table was created named 'USEFUL VALUES' which (as its name suggests) contained useful values which are referenced in order to calculate the values in the revenue and expenses table. In the first column of this table, the values were referenced to the values in the first sheet. After which they were named as suitable ranges accordingly. In the 2<sup>nd</sup> column, the growth rates of the values in column were added.

There is a separate USEFUL VALUES table for each year which includes the following

- 1) US & Russia participants: This contains the value of US & Russia participants in the year given the expected growth rate
- 2) International participants: This contains the value of international participants in the year given the expected growth rate
- 3) Exchange charges: This contains the exchange charges of international as well as US & Russia participants with the given expected rate of inflation.
- 4) New participants: The number of new participants in the year given the expected growth rate
- 5) New participants exchange charges: Given half of normal exchange charges
- 6) Total international participants: Useful for checking if number of international participants is more than what the server can handle.
- 7) US & Russia service costs: The service costs that the US & Russia participants pay adjusted according to inflation at that particular year
- 8) International participants service cost: The service costs that the international participants pay adjusted according to inflation at that particular year
- 9) New participants service cost given 60% of international participants service cost

In addition to the 'USEFUL VALUES' table, another table was created beside it, titled, 'SHOULD NEW SERVER BE INSTALLED?' which uses the if function in excel to check whether the number of international participants is greater than the no of international participants at max capacity. The year it says yes (year 5-6), a new server is installed prior to the year it says yes.

Coming to the important part of the worksheet, that is calculating after tax cashflow.

- In year 0-1, the revenue was calculated by the addition of the following components:
  1. Exchange Charges: This was the exchange charges paid by both, the international participants as well as the US & Russia participants. This was found out by multiplying the exchange charges rate by the total of international participants & US & Russia participants. Both values in the 'USEFUL VALUES' table
  2. Exchange Charges to new participants: This was calculated by multiplying the number of new participants and the exchange charges rate for new participants. Both values in the 'USEFUL VALUES' table
  3. Service Cost:
    - (i) US & Russia participants: The service cost rate of US & Russia participants was multiplied by the number of US & Russia participants. Both values in the 'USEFUL VALUES' table
    - (ii) International participants: Service cost of international participants was multiplied by the number of international participants. Both values in the 'USEFUL VALUES' table
    - (iii) New participants: The rate for the new participants was 60% of the international participants thus the formula used was  $0.6 * \text{INTERSC} * \text{NEWPAR}$ . Both values in the 'USEFUL VALUES' table
- And the expenses were calculated by adding the following components:

1. R&D: Given in problem statement
  2. Infrastructure: Given in problem statement
  3. G&A: Given in problem statement
  4. Advertising: Given in problem statement
  5. Depreciation: Referenced to C6 IN SUMMARY.
- Working capital consists of the following:
    1. A/C receivable: Given-5% of revenue
    2. Inventory: Given- 10% of revenue
    3. A/C payable: Given- 6% of revenue

EBIT was calculated by subtracting total expenses from the total revenue.

Interest was calculated by multiplying the bond rate by the amount of debt present

EBT was calculated by subtracting interest from EBIT

Tax-Given 10% of revenue

Thus, After Tax Cash flow was found by subtracting tax from EBT.

- In year 1-2,
  1. The calculation of the revenue was like the previous year. The values were referenced from those in the 'USEFUL VALUES' table.
  2. The calculation of expenses was different as instead of INFRA and R&D, there was an additional G&A Expense which was given in the problem statement. A formula was created which included the yearly growth rate it had.

The rest of the calculations were done in the same way as in the previous year.

The above tables were copy pasted/dragged down till year 9-10.

It is observed that in year 5-6, the 'SHOULD NEW SERVER BE INSTALLED?' table returns 'yes' therefore a new server is required. Thus, a new expense is added to the prior year (year 4-5) called Server Cost which includes inflation as well.

In year 9-10, the infrastructure will be sold, and we have been given that we will acquire a salvage value which will be added to the revenue.

Finally, pie and doughnut charts were created for each year's total revenue and expenses distribution.

Last but not the least a histogram was created depicting each year's After-Tax Incremental Cash Flow.

The third worksheet (NPV, IRR) calculates the NPV, IRR and creates NPV profiles.

In the first one, the NPV is calculated by keeping  $i$  as 11%. Firstly, all the revenues and expenses are referenced back from the second worksheet. Further, they are discounted by their respective discount factor which is calculated by  $1/(1+i)^{\text{time}}$ . After this the expenses are subtracted from the revenue in the third column. It is also given that in the final year the working capital and assets (new server) are sold at book value, thus these are also added to the revenue column and discounted in similar fashion. The third column is then autosummed. The value obtained is the NPV.

This table is the copy pasted/dragged down to create 3 more tables.

One of these tables is used to calculate IRR. Since we do not know what  $i$  is the IRR, we take a random number, in this case 10% and then complete the table. After which goal seek is used to set NPV to 0 by changing the  $i$ .

The other two are used to create NPV profiles. This is done just by changing the  $i$  to 10% and 15%

It is to be noted that the IRR is very high as the income is way higher than the expenses.

The final worksheet titled 'NPV, IRR >10', estimates the NPV and IRR as well as creates NPV profiles assuming the project lasted longer than 10 years. In this case, I am assuming it to go till year 12-13.

My assumptions for the calculations are as follows

- The growth rate for all participants, the inflation rate, the bond rate, taxes remain constant as they did in the previous years.
- A new server will be required when the current one is working at max capacity
- More R&D will be required as it is the start of a new decade thus there could be new developments in the market
- New infrastructure will be needed as old one might be working at max capacity.
- The money spent on infrastructure and R&D will be the same as that which was spent in the first year adjusted to inflation
- The money spent on the server will cost as much as it did the first time and adjusted to inflation.

In order to satisfy the above assumptions, I firstly calculated the number of international participants that will run the server at max capacity. This was done by multiplying 2 to the previous max capacity of the server. Afterwards, I calculated the cost of R&D, Infrastructure and new server cost with inflation. I made a table which calculated the number of international participants in each particular year then created an if statement to check whether this exceeded the max capacity of the server, if it did it said yes which meant a new server had to be installed in the previous year.

The revenue and expenses tables are made in a similar fashion as was done in the 2<sup>nd</sup> worksheet.

The NPV and IRR as well as the NPV profiles are made just like they were made in the 3<sup>rd</sup> worksheet.