National College of Ireland

Configuration Manual

MSc Research Project
MSc FinTech

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MSc Project Submission Sheet

School of Computing

Student Name:	Barath Ramesh Yadawad
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Programme:	MSc FinTech **Year:** 2023-2024
Module:	MSc Research practicum/Internship
Supervisor:	Noel Cosgrave
Submission Due Date:	September 2nd 2024
Project Title:	Improving Efficiency of Valuation: A Comprehensive Study of Building Discounted Cash Flow Models and Financial Dashboard
Word Count:	1404 **Page Count:** 8

I hereby certify that the information contained in this (my submission) is information pertaining to research I conducted for this project. All information other than my own contribution will be fully referenced and listed in the relevant bibliography section at the rear of the project.
ALL internet material must be referenced in the bibliography section. Students are required to use the Referencing Standard specified in the report template. To use other author's written or electronic work is illegal (plagiarism) and may result in disciplinary action.

Signature: Barath Ramesh Yadawad

Date: September 2nd 2024

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1 Introduction

My research is being submitted as a vital part of the MSc Fintech module, along with this Configuration Manual, the objective of this manual is to provide assistance to the user in reproducing the model that has been formulated in this study. The present handbook outlines the orderly procedures for constructing the Discounted Cash Flow valuation model using Google Sheets. Begin with obtaining financial data from the past three years and proceed to generate five distinct sheets in Google Sheets: Free cash flow, Fixed assets, Net working capital, WACC, DCF.

2 Source of Data:

The data in this research was obtained from Internal financial data from the company, which includes Income Statement, Balance sheet, Cash flow statement. The data set contained historical financial data such as revenue, expenses etc. The data was obtained database in google sheet format. In order to improve the analysis, the entire dataset underwent thorough cleaning and transformation procedures to guarantee precision and suitability for the analytical models employed in this study.

3 Discounted Cash Flow Model Template

Unlevered Free Cash Flow (mm)							
Fiscal Year	2021A	2022A	2023A	2024E	2025E	2026E	2027E
Revenue							
COGS							
Gross Profit							
Operating Expenses							
Selling, General, Administrative							
Total Operating Expenses							
EBITDA							
Depreciation & Amortization							
Operating Profit (EBIT)							
Operating Taxes							
NOPAT (Net Operating Profit After Taxes)							
(+) Depreciation & Amortization							
(-) Capital Expenditures							
(-) Change in NWC							
NWC							
Current Assets							
Current Liabilitites							
Unlevered Free Cash Flow							

Figure 1: Unlevered Free Cash Flow.

A-Actual Years, E-Estimation years.

Assumptions							
Fiscal Year	2021A	2022A	2023A	2024E	2025E	2026E	2027E
Revenue Growth							
COGS% of Revenue							
SG&A % of Revenue							
Tax % of EBIT							

Figure 2: Assumptions for Unlevered free cash flow.

We need to have assumptions in percentage for next 4years:

- Revenue growth- Simplified estimate from the previous years.
- COGS% of Revenue- Formula Average (3 years Actual COGS% of Revenue).
- SG&A% of Revenue- Formula Average (3 years Actual SG&A% of Revenue).
- Tax% of EBIT- Cooperate Tax rate.

Fixed asset Schedule							
Fiscal Year	2021A	2022A	2023A	2024E	2025E	2026E	2027E
Begginning PP&E							
D&A							
CapEx							
Ending PP&E							
Assumptions							
Fiscal Year	2021A	2022A	2023A	2024E	2025E	2026E	2027E
D&A as a % of Beginning PP&E							
CapEx as a % of Begining PP&E							

Figure 3: Fixed Asset and Assumptions.

- Assumptions for D&A as a % of Beginning PP&E can be derived from: Average (previous years D&A as a % of Beginning PP&E).

Net Working Capital							
Fiscal Year	2021A	2022A	2023A	2024E	2025E	2026E	2027E
Accounts Receivables							
Merchandise Inventory							
Other Current Assets							
Current Assets							
Accounts Payable							
Accrued Salaries and Benefits							
Accrued Member Rewards							
Deferred Membership Fees							
Other Current Liabilities							
Current Liabilities							

Figure 4: Net Working Capital.

Assumptions							
Fiscal Year	2021A	2022A	2023A	2024E	2025E	2026E	2027E
Revenue							
COGS							
Days Sales Outstanding (DSO)							
Days Inventory Outstanding (DIO)							
Days Payable Outstanding (DPO)							
Other Current Assets as a % of Revenue							
Accrued Salaries as a % of Revenue							
Accrued Member Rewards as a % of Revenue							
Deferred Membership Fees as a % of Revenue							
Other Current Liabilities as a % of Revenue							

Figure 5: Net Working Capital Assumptions.

Understanding the Assumptions value for Actual Years:

- Days Sales Outstanding (DSO): Account receivable/Revenue x 360.
- Days Inventory Outstanding (DIO): Merchandise Inventory/COGS x 360.
- Days Payable Outstanding (DPO): Accounts Payable/COGS x 360.
- Other Current Assets as a % of Revenue: Other Current Assets/Revenue.
- Accrued Salaries as a % of Revenue: Accrued Salaries and Benefits/Revenue.
- Accrued Member Rewards as a % of Revenue: Accrued Member Rewards/Revenue.
- Deferred Membership Fees as a % of Revenue: Deferred Membership Fees/Revenue.
- Other Current Liabilities as a % of Revenue: Other Current Liabilities/Revenue.

Understanding the Assumptions value for Estimated Year:

- Days Sales Outstanding (DSO): Average of Previous year's days Sales Outstanding.
- Days Inventory Outstanding (DIO): Average of Previous year's days Inventory Outstanding (DIO).
- Days Payable Outstanding (DPO): Average of Previous year's days Payable Outstanding (DPO).
- Other Current Assets as a % of Revenue: Average of previous year Other Current Assets as a % of Revenue (The average which we got for the 1st estimated year should be same for next 2 years).
- Accrued Salaries as a % of Revenue: Average of previous year Accrued Salaries as a % of Revenue (The average which we got for the 1st estimated year should be same for next 2 years).
- Accrued Member Rewards as a % of Revenue: Average of previous year Accrued Member Rewards as a % of Revenue (The average which we got for the 1st estimated year should be same for next 2 years).
- Deferred Membership Fees as a % of Revenue: Average of previous year Deferred Membership Fees as a % of Revenue (The average which we got for the 1st estimated year should be same for next 2 years).
- Other Current Liabilities as a % of Revenue: Average of previous year Deferred Membership Fees as a % of Revenue (The average which we got for the 1st estimated year should be same for next 2 years).

- Non-cash working capital formula: Current assets – Cash – Current Liabilities (Kenji, 2022).

Weighted Average Cost of Capital (WACC)	
Equity (mm)	
Debt (mm)	
Cost of Debt	
Tax Rate	
D/(D+E)	
After Tax Cost of Debt	
Risk Free Rate (10-Yr Treasury Yield)	
Expected Market Return	
Market Risk Premium	
Levered Beta	
E/(D+E)	
Cost of Equity	
WACC	

Figure 6: WACC.

Understanding the WACC parameters:

- Debt(mm): Previous year Sum (Current portion of long-term debt, Long-term debt, excluding current portion) in Balance sheet.
- Cost of debt: Previous year (-) Interest expenses /debt.
- Tax rate- Corporate Tax rate.
- D/(D+E): Debt/sum (Debt, Equity).
- After Tax cost of debt: Cost of debt (1-Tax rate).
- Market risk premium: Expected Market Return- Risk Free Rate (10-Yr Treasury Yield).
- For calculating Cost of equity, we need to use CAPM (Capital asset pricing model).

Unlevered Free Cash Flow (mm)							
Fiscal Year	2021A	2022A	2023A	2024E	2025E	2026E	2027E
Unlevered Free Cash Flow							
Projection Year				1	2	3	4
Present Value of Free Cash Flow							

Figure 7: DCF:

Implied Share Price Calculation	
Sum of PV of FCF	
Growth Rate	
WACC	
Terminal Value	
PV of Terminal Value	
Enterprise Value	
(+) Cash	
(-) Debt	
(-) Minority Interest	
Equity Value	
Diluted Shares Outstanding (mm)	
Implied Share Price	

Figure 8: Implied Share Price.

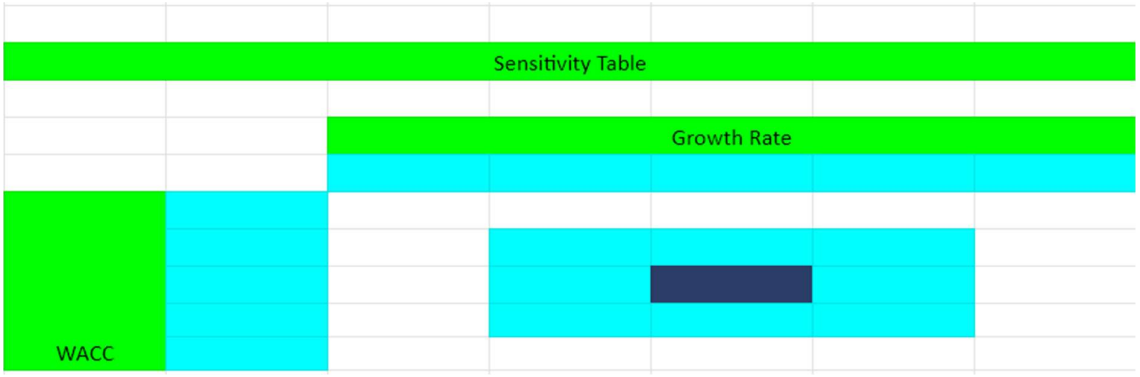

Figure 9: Sensitivity Tabel.

4 Power BI and Google Data Studio

Power BI and Google Data Studio are the visualization platforms where user can build financial dashboard.
Install Power BI on your desktop and, for Google Data Studio, you may do it online. Begin by uploading the data into platforms and selecting the specific data you wish to visualize.

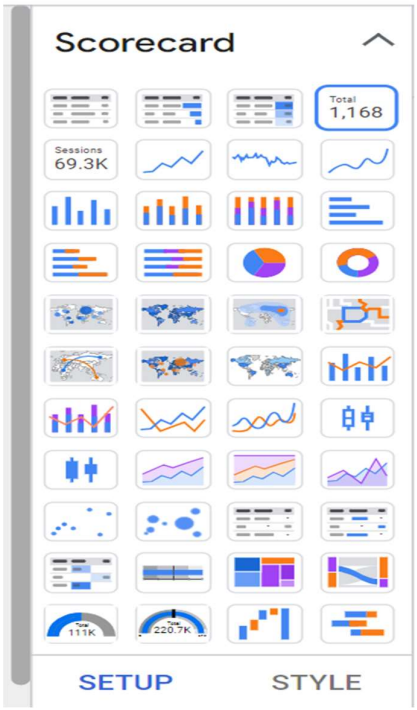

Figure 10: Selection of chart, Graphs types can be made from the dropdown menu in Google Data Studio.

5 OLS Regression

Ordinary least squares (OLS) regression is a statistical method that use a linear regression model to evaluate the association between two variables at the interval or ratio level.

Step 1: organize your data

Example:

Time taken before dashboard for decision making	Time taken after dashboard for decision making
30	17
24	11
15	08

Table 1: Data organization Example.

Step 2: Enable Data setup

Excel > Options > Add-ins > Manage, Excel Add-ins, Go > Analysis Tool Pack > Ok

Step 3: Perform OLS Regression

Data Tab > Data analysis dialog > Regression > Ok > Input the data X range and Y range > Ok

Step 4: Key inputs:

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.953820966
R Square	0.909774436
Adjusted R Square	0.819548872
Standard Error	3.207134903
Observations	3

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	103.7142857	103.7142857	10.08333333	0.194224113
Residual	1	10.28571429	10.28571429		
Total	2	114			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 98.0%*	*Upper 98.0%*
Intercept	4.142857143	6.220440302	0.666007058	0.625956719	-74.89533088	83.18104517	-193.7947627	202.080477
X Variable 1	1.571428571	0.494871659	3.175426481	0.194224113	-4.71651205	7.859369193	-14.17564296	17.3185001

Figure 11: Key inputs from the OLS Regression.

6 Sensitivity Analysis:

The model underwent with sensitivity analysis to incorporate part of the uncertainty. This enables the analyst to assess the consequences of substantial alterations in fundamental assumptions.

Step 1: Excel > Select the cells > Data Tab > What if analysis > Data Table > Select the data

7 Conclusion:

The DCF model with a customized formula that automatically integrates new data as it is obtained. In order to enhance the precision of the valuation, this automated process ensures the continuous updating of the DCF model without the introduction of errors. By eliminating the need for manual data entry and reducing the possibility of human mistake, the model consistently delivers accurate and reliable valuations.

Consistency: The valuations generated by the DCF model have continuously corresponded with the internal projections and expectations of the organisation. The confirmation of this alignment serves to validate the trustworthiness of the model and strengthen its significance as a fundamental instrument in our financial decision-making process.

The configuration manual included an overview of the DCF model template used in this work, the Power BI and Google Data Studio applications, the OLS regression technique, and sensitivity analysis.

References

Kenji Explains. (2022) Build A Full Discounted Cash Flow Model for a Real Company.

Available at: https://www.youtube.com/watch?v=77xkumpio48 [Accessed 1 July 2024]

Regression - Sociology 3112 - Department of Sociology - The University of Utah. (n.d) Available at: https://soc.utah.edu/sociology3112/regression.php#:~:text=Ordinary%20least%20squares%20(OLS)%20regression%20is%20a%20process%20in%20which,squares%22%20in%20the%20name).