

Duolingo (NASDAQ: DUOL)

On the Horizon to Experience Exponential Growth



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t dm.
GROWTH PARTNERS

BUY

Target Price: \$181.59

Last Close: \$147.20

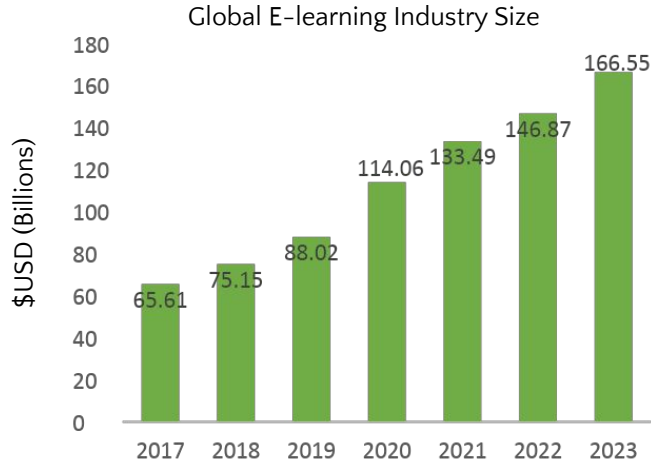
Potential Upside: 23.33%

 **HORIZON
CAPITAL**

TDM should Incorporate Duolingo into their Portfolio

Investment Recommendation	A buy recommendation with \$181.59 target price, potential upside of 23.33% and 32% IRR		
Industry Overview	Significant Historical growth and Barriers to Entry within Digital Learning Industry that Duolingo Benefits From		
Business Overview	Duolingo is a High Growth Company with a Diverse App Range and Revenue Streams		
Investment Thesis	Competitive advantage enables user base expansion and retention	Margin growth from monetisation of Duolingo maths, music and max	Revenue growth from increased international opportunities
Valuation	Blended Valuation and IRR supports a buy recommendation	Assumptions include increased revenue from users, subscriptions, tests and decreased costs	Bullish scenario analysis and sensitivity supports a buy
Risks and Mitigation	Cyclical	Competition	Cybersecurity

We've Considered Growth and Competition in Digital Language Learning



E-learning CAGR 2020-2023



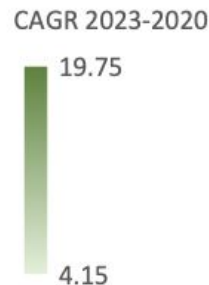
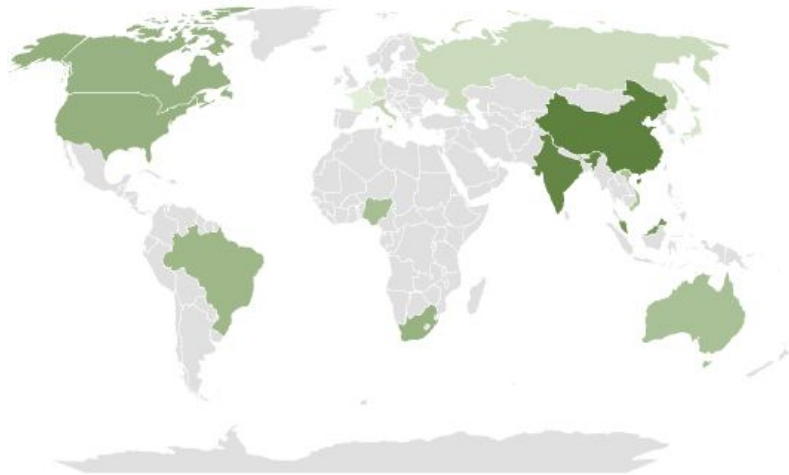
Digital Language Learning CAGR 2023-2030



English digital language learning CAGR 2023-2030

- Growth Drivers**
- Remote Learning
 - Online Certifications
 - AI LLM development
 - Mobile-first experience

Digital Language Learning: High Growth Countries



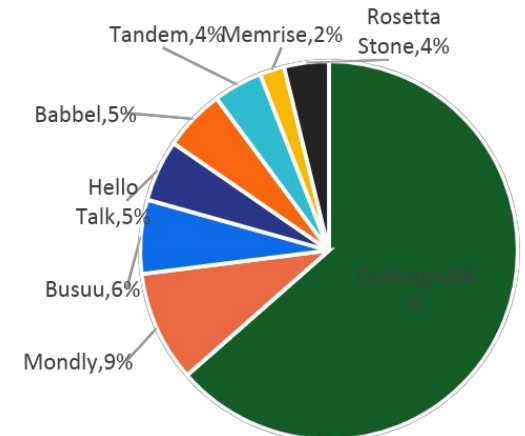
Competitors



Highly fragmented market with many significant competitors. Duolingo is the exception

Duolingo's 64% market share highlight its strong brand reputation within digital language learning

Competitive landscape



Duolingo Market Share

Duolingo is a High Growth Stock with a Multi-subject Gamified Offering

Duolingo operates on a freemium model to offer highly-accessible online education to users on their mobile devices

Duolingo's Key Metrics

\$369.5m
Revenue

500m +
Downloads

40.2m
Active Users

Duolingo Apps



Language



Maths



Literacy



Music

Duolingo's Revenue Streams

Subscriptions

74.02%

Users on subscription plans

Advertising

12.11%

In-app advertisements

English Tests

8.86%

Digital English Testing

Other

5.02%

In-app Purchases

18-34

Forms **54%** of their user base

24%

Duolingo users focus on English lessons

22%

Duolingo users are in the US, their largest geographic region

Duolingo Share Price

Duolingo considered a 'COVID winner' as user base skyrocketed

1-year

Share Price History

+95%

Share Price Growth

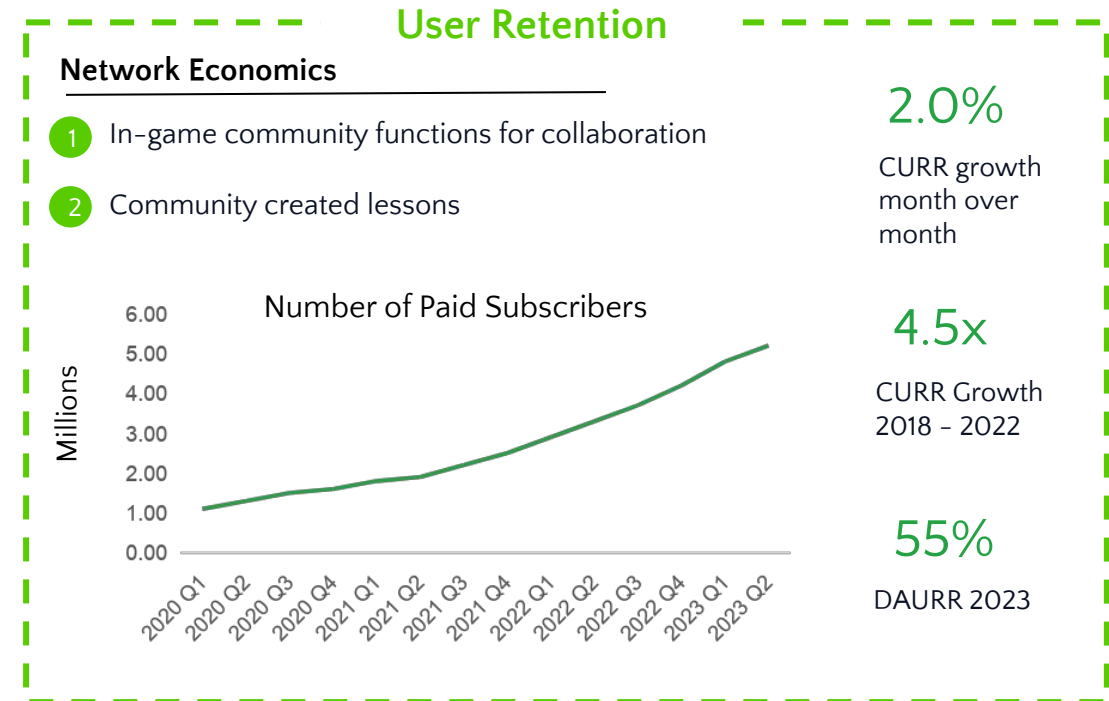


Duolingo's competitive advantage positions for top-line growth

Hamilton Helmer's 7 Power Framework



With the industry's high forecasted growth and inflow of new learners, Duolingo's branding and dominant market-reach allows for optimal capture of this growth, increasing their user base and gross revenue



With Duolingo's network economics, new users gained in growth will be retained through integration into Duolingo's community, improving customer life-time value, conversion rates and total gross revenue

Multi-subject experience drives expansion into education-technology firm

Subject expansion leads to a larger user pool – Duolingo Maths

Large market for adults who want to 'stay sharp'

300,000 iOS downloads August 2023

Career Paths

35% of UK adults in a study believe that they would be unlikely to take on a role if it required using numbers and data

Career Paths

20% believe their lack of numeracy confidence has affected career choices and impacted their earnings

Platform

28% want to improve their skills, but admitted they are uncertain about where and how to start

Monetisation

Paid subscription penetration is easier for an older market.

Projected to reach product-market fit in 2024.

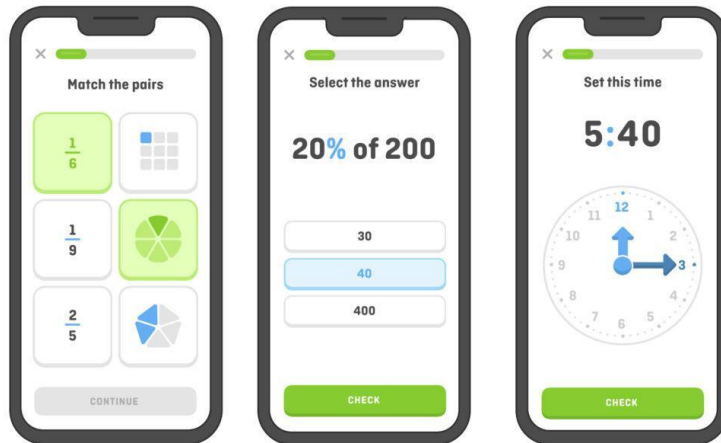
Source: KPMG, 2023

Top 25 Of education apps in UK, with Duolingo at #1

Top 40 Of education apps in Canada, with Duolingo at #1

93%

Of adults in USA experience math anxiety in some form



Expansion into primary education



• US NEAP numeracy results have been the lowest since 1990.



• -1800 US schools actively integrate Duolingo into their learning



• Estimated 40% of US schools interact with Duolingo either in class or through individual students

Upcoming Duolingo Music taps into a large market

Accessibility

-3.6 million students do not have access to music education

Price

Private lessons cost up to \$400

Potential

Online music education market to generate revenue of \$829.15 million by 2031

Language, mathematics, music will converge in a centralised learning platform with high scalability, pushing Duolingo towards an **education-technology firm**.

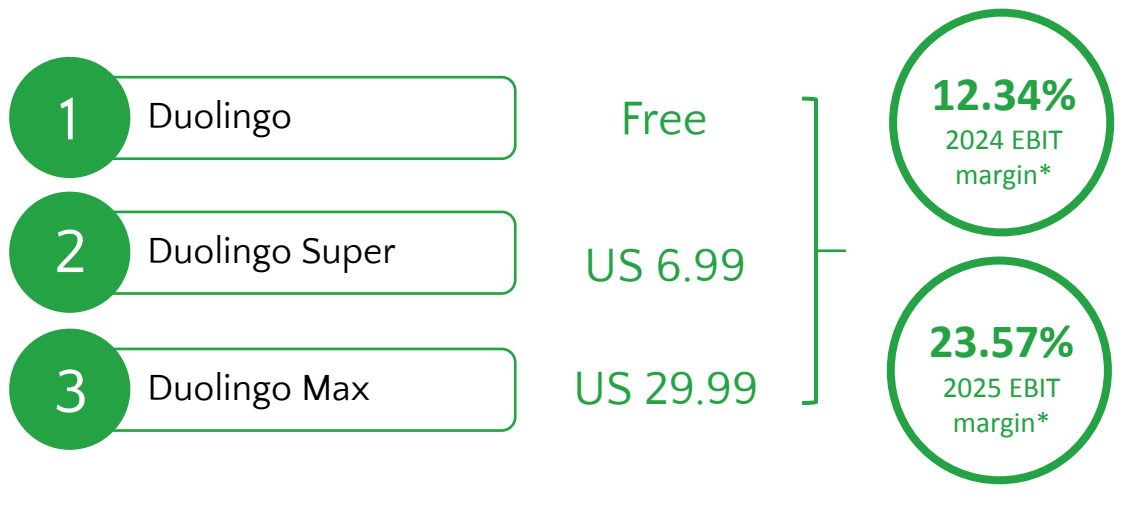
Duolingo Max tier and investments into AI allows for margin growth

New subscription tier drives revenue growth

At the forefront of a changing global learning environment, AI is becoming a massive tailwind for Duolingo.

52.8% conversion rate from free to paying users on Android

A small conversion percentage translates to high returns

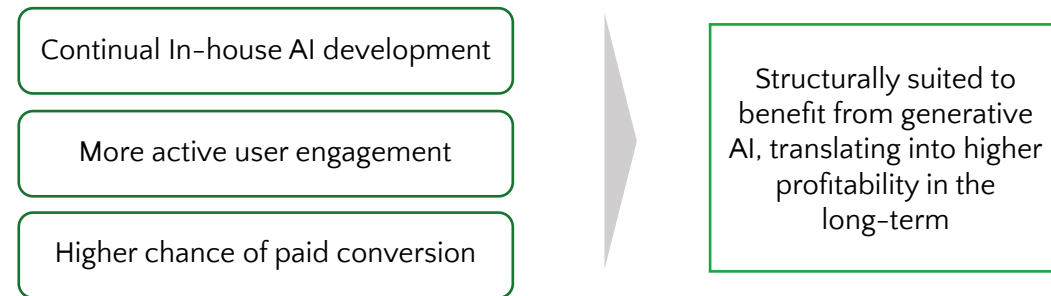


*Forecasted using Horizon Capital financial model

AI allows for cost-base reduction

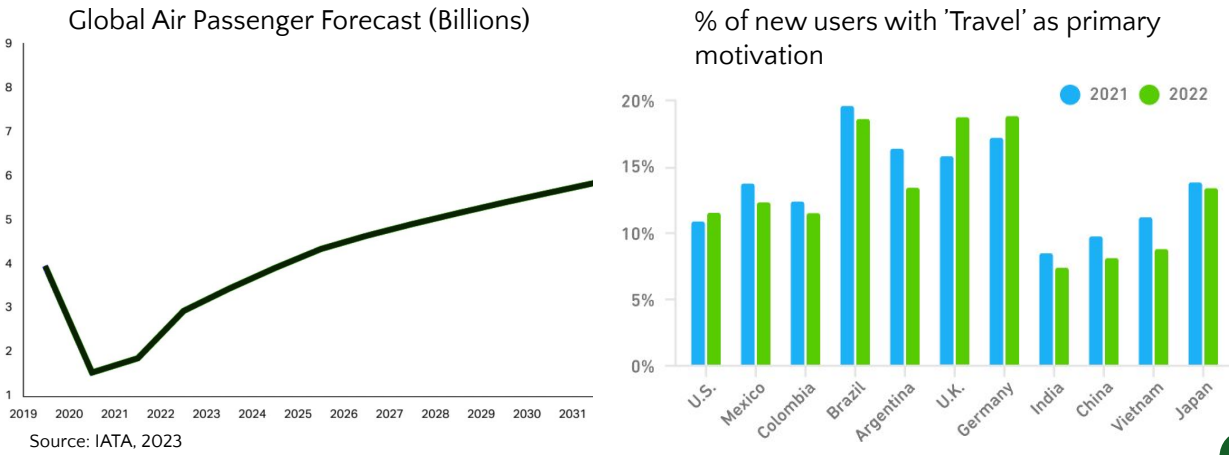
- Using the newest technology to drive learning quality**
 - Duolingo Max uses OpenAI's GPT-4 for AI-powered responses and lessons, making it competitive with real 1-1 human tutors.
- Lower costs and increase scalability**
 - R&D investments into AI improve the speed of content creation. Language learning model costs are expected to decrease, allowing DUOL to reap higher margins.
- 'Birdbrain' AI analyses user's learning journey for personalisation**
 - With -1.2b exercises completed daily, DUOL has the world's largest learning dataset, which is fed into ML algorithms to improve teaching

Investment into AI boosts engagement



Paid subscription and DET growth is driven by macroeconomic trends

Global demand for travel post-COVID



13% of users use Duolingo Primarily For Travel

2b

Forecasted air passenger increase for 2023-2030

85%

U.S believe learning a new language improves travel

Increase of new users in the UK, Germany, US with 'travel' as the primary motivation

50%

Higher Duolingo usage rate after travelling

49%

US consumers are expected to have travelled more in 2023

Demand for English increased due to macroeconomic tailwinds

1st

3rd

18%

22%

India ranks #1 in Duolingo English learners

UK ranks #3 in Duolingo English learners

Foreign-born workers in the UK make up 18% of workforce

English language CAGR

duolingo english test

4500

Universities accept DET Certification globally

63%

English Test Revenue Growth 2022

\$59

For DET, no additional costs for sending results

\$200

For TOEFL, additional \$20 for sending results

Opportunity to capture testing market share through accessibility, thereby increasing sales



India is now the top country for DET takers, overtaking China. There is more than a 75% YoY increase in Indian students certifying their English proficiency.

Led by experienced individuals and viewed positively internally

Management Analysis



Luis Von Ahn

CEO, ~12 years on board. B.S in Mathematics & PH.D in Computer Science



Severin Hacker

CTO, ~12 years on board. B.S & PH.D in Computer Science



Matthew Skaruppa

CFO ~3 years, B.S in Chemical Engineering and M.B.A from Stanford



Natalie Glance

Chief Engineering Officer, B.A in Physics from Princeton and Ph.D in Physics from Stanford



Stephen Chen

General Counsel ~3 years, B.A in History and J.D from Harvard University



Robert Meese

CBO, B.S in Economics and B.S in Computer Science from UOP and M.B.A from MIT



Molly Lindsay

CPO, B.A in History from Yale and a M.B.A from Stanford



Manu Orssaud

CMO, ~9 years developing Sony Playstation,

1.52%

Insider Ownership

45%

Independent Directors

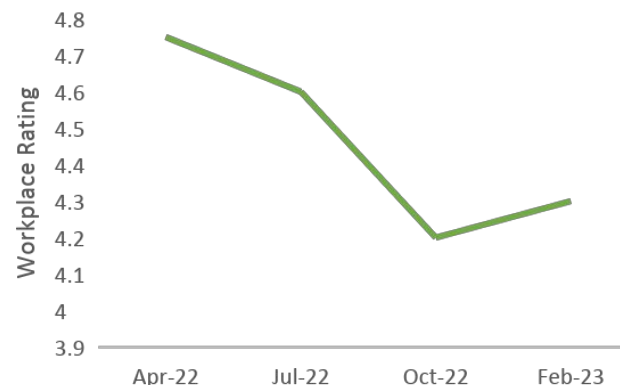
Duolingo's Executive Team is well-rounded, experienced, vast and not prone to pressure from external stakeholders. This results in genuine care for the company and thus better strategy for Duolingo's growth

Duolingo's workplace has been rated positively

Key Views

- The culture is focused on continuous growth and learning. They have a focus on collaborative with kindness, and continuously exploring new ways of improving
- Duolingo is all about having fun and problem solving – as evidenced by their TikTok reels which showcase their unique culture
- Their employees focus on innovation – finding new ways to penetrate the language learning market and being able to improve the platform for its users, using data from its users for growth

Duolingo, Glassdoor and Internal culture reviews

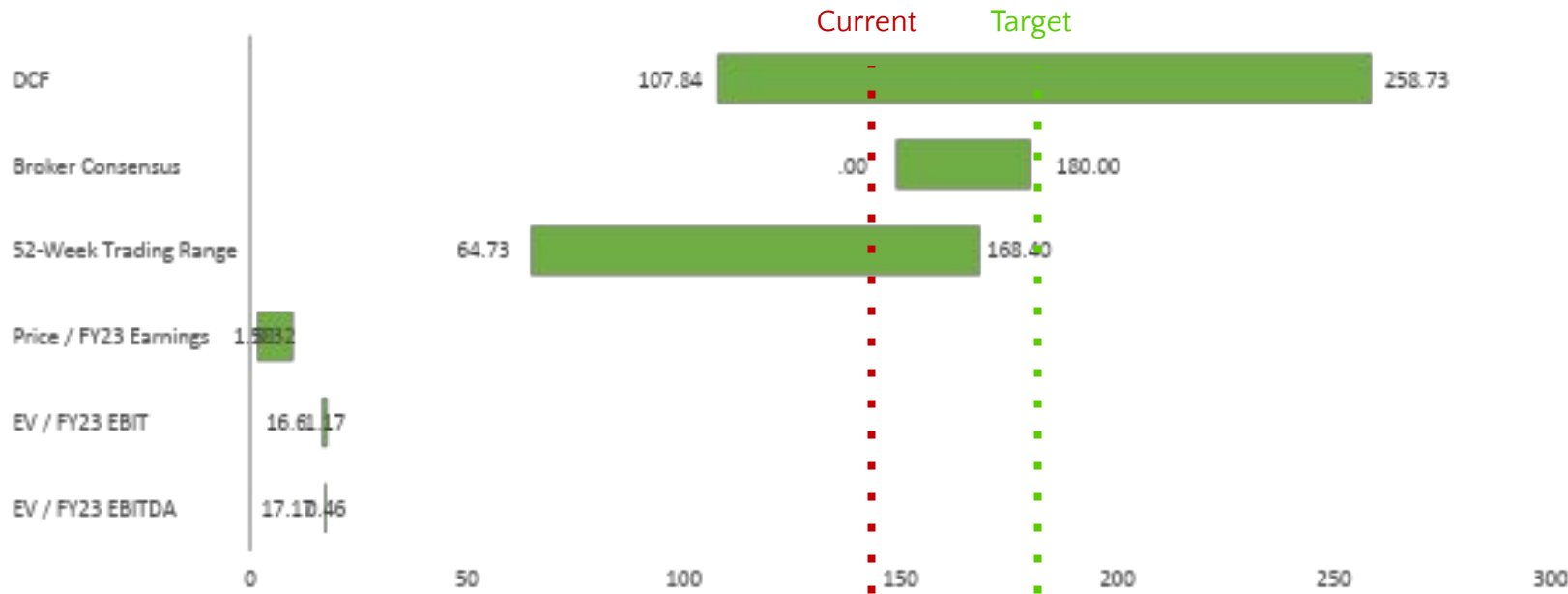


- “Opportunities for career growth like responsibility and management, especially for folks early in career – mission driven: we prioritise the user experience over \$ - Super smart employees, very metrics driven – Our CEO is awesome, and employees are able to get a lot of visibility within him – Quirky and fun culture”



“Duolingo’s goal has always been to teach as well as a human can but with a computer. They are a product-driven company and there is lots of room to grow”

Blended Valuation gives \$181.59 Target Price and Bullish Development



Commentary

Blended DCF – 90%

- Mispriced Growth Assumptions
- WACC: 9.22%
- Perpetuity – TGR: 3.18% – 35%
- Exit Multiple – EV/EBITDA: 7.7x – 65%

Broker Consensus – 10%

- Expert opinions on how Duolingo will perform
- Limited to 1 Year Forecast

52 Week Trading Range – 0%

- Low: 28 December 2022
- High: 6 June 2023

1

- Bull Case – 30%**
- Duolingo User Base rapidly grows
 - Exceeds forecasted region and industry growth
 - Higher proportion of subscriptions
 - Significant increase in subscription revenue per user

2

- Base Case – 50%**
- Duolingo User Base increases
 - Matches forecasted region and industry growth
 - Moderate subscription increase
 - Increase in subscription revenue per user

3

- Bear Case – 20%**
- Duolingo user base slowly grows
 - Less than forecasted region and industry growth
 - Lagging subscription increase
 - Underwhelming increase in subscription revenue per user

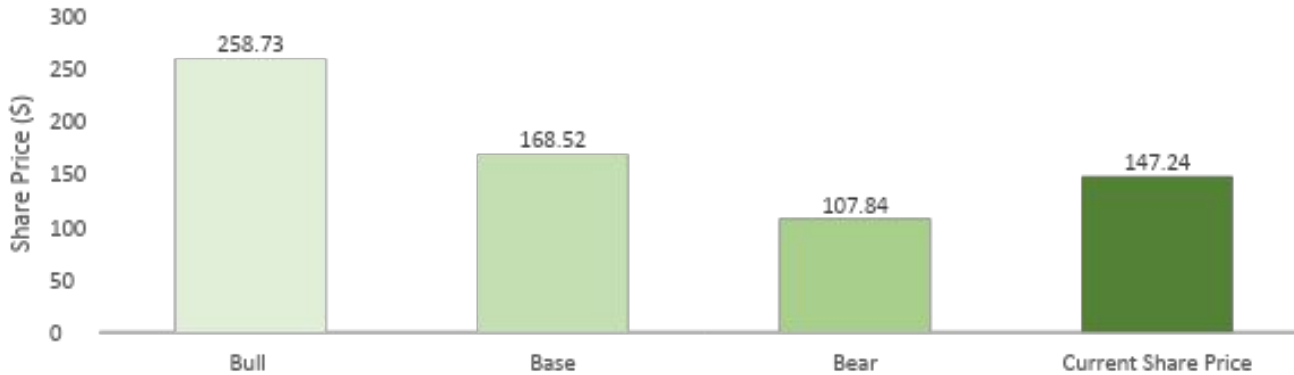
Omitted Valuation

Relative Valuation – 0%

- Duolingo's language learning competitors are private
- Unreliable Valuation Approach
- Duolingo's FY23 metrics do not account for their forecasted exponential growth

Our DCF Incorporated our Theses To Support Our Recommendation

DCF Model Cases



Model Assumptions

Revenue Growth

Monetisation of Duolingo Max, Maths and Music coupled with Duolingo and Travel growth delivers increases in year-on-year sales

Margin Growth

As English Test Papers, Proportion of Paid Subscribers and Revenue per Subscription increases, SG&A expenses and cash as proportion of sales decreases to reflect higher margins

CAPEX

Duolingo's investments into the monetisation of Duolingo Maths, development of Duolingo music and full release of Duolingo Max should increase CAPEX until completion in 2025

Sensitivity Analysis (Base Case): WACC v Terminal Growth Rate

		WACC (%)				
		\$168.52	7.22%	8.22%	9.22%	10.22%
Terminal Growth rate (%)	1.18%	185.38	169.50	156.34	145.07	135.22
	2.18%	195.86	176.74	161.57	149.00	138.26
	3.18%	211.54	186.84	168.55	154.05	142.05
	4.18%	237.53	201.95	178.28	160.78	146.92
	5.18%	289.01	226.99	192.84	170.17	153.41

A sensitivity analysis reveals the majority of the share prices are above the current price

Key Metrics

25%

Target IRR

32%

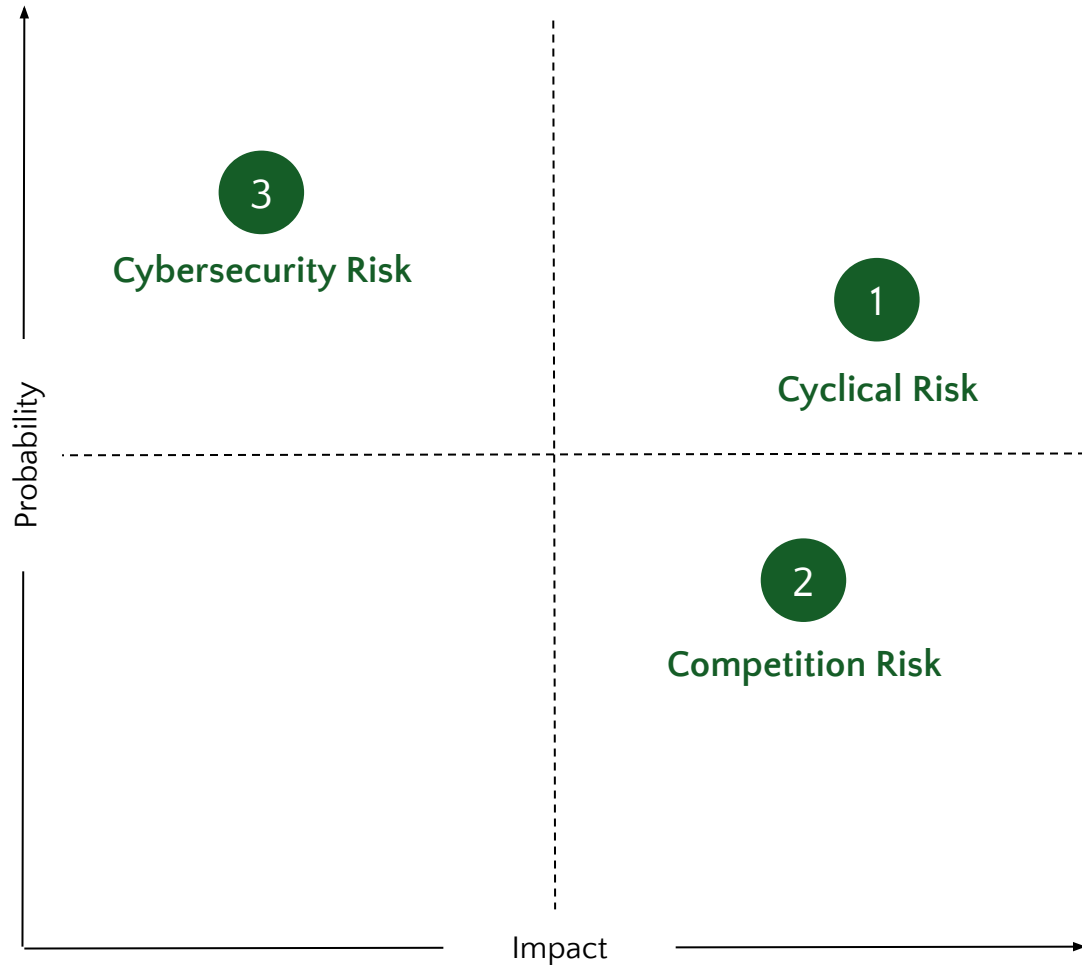
Duolingo IRR

23%

Premium

We have considered Duolingo's capacity to mitigate risks

Duolingo Risk Matrix



1

Cyclical Risk

Risks: Duolingo's paid subscriptions and in-app purchases are consumer discretionary spends which could decrease during global slowdowns or recessionary periods.

Mitigation: Since Duolingo's products are educational they remain high on discretionary spends which was evident throughout COVID. The blow will be softened by Duolingo's large market capture and DET.

2

Competition Risk

Risks: The digital language learning industry is highly competitive with low barriers of entry and low switching costs which could disrupt Duolingo's strong growth.

Mitigation: TDM must ensure that Duolingo leveraging their strong market share and financial resources to innovate and thus retain their competitive advantage through offerings like their upcoming Duolingo music.

3

Cybersecurity Risk

Risks: Since Duolingo uses AI and data to drive the app experience they handle private user information which if leaked could harm Duolingo's branding.

Mitigation: Ensuring Duolingo uses strong data protection should lower the risk of data leaks.

In Summary We Recommend TDM to Invest in Duolingo

TDM Investment Principles

Target Business: Aligns with TDM's industry agnostic approach to their portfolio as they don't currently invest in an education technology company

Growth Opportunities: High organic growth potential from user base, subscriptions and English tests expected to persist for the next 5 years driven by product offerings and region growth

Competitive Advantage: AI-driven gamification model allows it to act as a monopoly within the highly competitive digital language learning industry – 64% market share

Culture and people: Positive work culture and a well-experienced and independent executive team that will provide genuine and better growth for Duolingo

TDM's Financial Metrics and Forecasts Requirements

✓	25% Target IRR	✓	Exit Multiple Ascertained From Comparables
✓	Premium From 5-year long-run model	✓	Model Assumptions, Scenarios and Sensitivity Considered

Investment Thesis

- User Growth and Retention From Duolingo's Competitive Advantage
- Margin and Subscription Growth From Duolingo Investments
- Subscription and Test Growth From International Opportunities

Valuation

- 90% Blended DCF
- 10% Broker Consensus
- Bull – 30%, Base – 50%, Bear – 20%

Potential Risks

- Cyclical Risk
- Competition Risk
- Cybersecurity Risk

Investment Recommendation



\$181.59 Target Price **23.33%** Upside **32%** IRR

Appendix Network

Main Deck

1. Title Slide
2. Executive Summary
3. Industry Overview
4. Business Overview
5. Investment Thesis 1
6. Investment Thesis 2
7. Investment Thesis 2
8. Investment Thesis 3
9. Management and Culture
10. Football Field and Scenario Analysis
11. Assumptions, Sensitivity and Key Metrics
12. Risks and Mitigation
13. Recommendation

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18. Revenue Drivers
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25. Football Field Analysis
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30. Supporting Schedules
31. Board Members
32. Management Members
33. Management and Board
34. ESG Ranking
35. Additional Risks
36. Expense Drivers

Broker Consensus Summary



DUOL Analyst Ratings

Moderate Buy



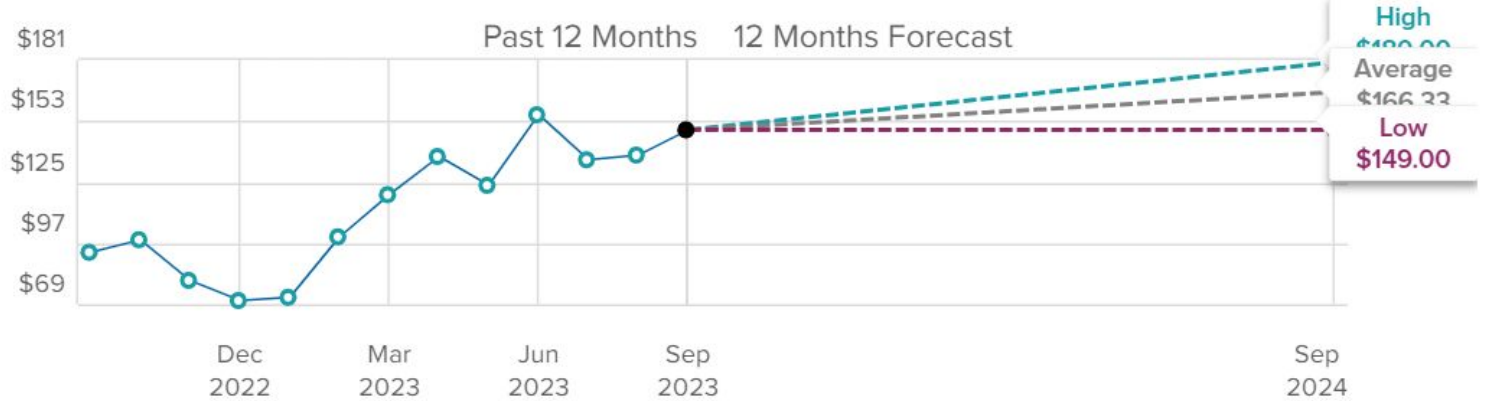
2 Buy 4 Hold 0 Sell

Based on 6 analysts giving stock ratings to Duolingo in the past 3 months

DUOL Stock 12 Months Forecast

\$166.33
▲(6.27% Upside)

Based on 6 Wall Street analysts offering 12 month price targets for Duolingo in the last 3 months. The average price target is \$166.33 with a high forecast of \$180.00 and a low forecast of \$149.00. The average price target represents a 6.27% change from the last price of \$156.51.



Highest Price Target **\$180.00**

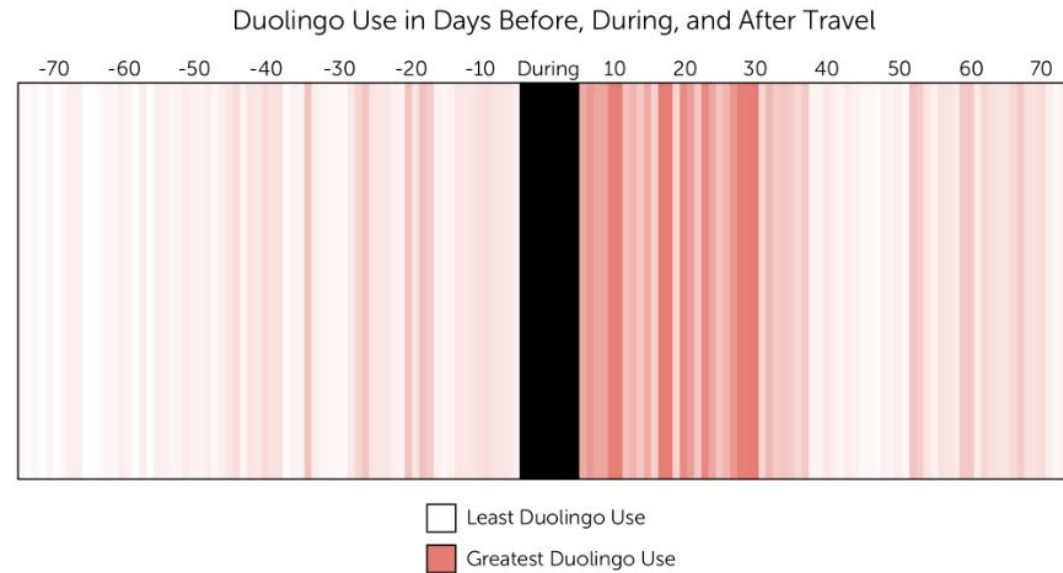
Average Price Target **\$166.33**

Lowest Price Target **\$149.00**

TDM Portfolio

Duolingo Usage Before and After Travelling



Duolingo use is visually higher in the weeks after a trip compared to the weeks prior. The median rate of usage in the week following a trip is 5 out of 10, while the rate of usage in the week before is only 2 out of 10. This indicates that users are motivated by their travels to better their language abilities, and return home to practice Duolingo more regularly.

Revenue Drivers

Switch Driver

2

Base

Revenue drivers	DEC '19	DEC '20	DEC '21	DEC '22	DEC '23	DEC '24	DEC '25	DEC '26	DEC '27
Total Number of Users					82.16	113.75	162.94	234.64	341.40
Bull					83.37	117.10	170.08	248.32	366.27
Base		36.7	42.4	60.7	82.2	113.7	162.9	234.6	341.4
Bear					80.94	112.10	160.67	231.38	336.70
Growth of users					35.35%	38.45%	43.25%	44.00%	45.50%
Bull			17.53%	45.16%	37.35%	40.45%	45.25%	46.00%	47.50%
Base			15.53%	43.16%	35.35%	38.45%	43.25%	44.00%	45.50%
Bear			13.53%	41.16%	33.35%	36.45%	41.25%	42.00%	43.50%
Free users									
Proportion of free users		95.64%	94.10%	93.08%	91.08%	89.35%	87.69%	87.19%	86.69%
# of free users		35.1	39.9	56.5	74.83	101.63	142.88	204.58	295.96
Paid subscribers									
Proportion of paid subscribers		4.36%	5.90%	6.92%	8.92%	10.65%	12.31%	12.81%	13.31%
# of paid subscribers		1.60	2.50	4.20	7.33	12.11	20.06	30.06	45.44
Bull		6.36%	7.90%	8.92%	10.92%	12.65%	14.31%	14.81%	15.31%
Base		4.36%	5.90%	6.92%	8.92%	10.65%	12.31%	12.81%	13.31%
Bear		2.36%	3.90%	4.92%	6.92%	8.65%	10.31%	10.81%	11.31%
Advertising Revenue									
Advertising Revenue		27.04	38.50	44.73	\$ 63.03	\$ 85.61	\$ 120.36	\$ 172.33	\$ 249.31
# of free users		35.10	39.90	56.50	74.83	101.63	142.88	204.58	295.96
Revenue per free user		\$ 0.77	\$ 0.96	\$ 0.79	\$ 0.84	\$ 0.84	\$ 0.84	\$ 0.84	\$ 0.84
Subscription Revenue									
Subscription Revenue		117.50	180.70	273.51	\$ 515.04	\$ 851.37	\$ 2,110.33	\$ 3,162.30	\$ 4,780.74
# of paid subscribers		1.6	2.5	4.2	7.33	12.11	20.06	30.06	45.44
Revenue per paid subscriber		\$ 73.44	\$ 72.28	\$ 65.12	\$ 70.28	\$ 70.28	\$ 105.21	\$ 105.21	\$ 105.21
Bull		\$ 78.44	\$ 77.28	\$ 70.12	\$ 75.28	\$ 75.28	\$ 115.21	\$ 115.21	\$ 115.21
Base		\$ 73.44	\$ 72.28	\$ 65.12	\$ 70.28	\$ 70.28	\$ 105.21	\$ 105.21	\$ 105.21
Bear		\$ 68.44	\$ 67.28	\$ 60.12	\$ 65.28	\$ 65.28	\$ 95.21	\$ 95.21	\$ 95.21
English Test Revenue									
English Test Revenue		15.16	24.66	32.72	48.32	71.37	105.41	155.69	229.95
English Test Growth			62.71%	32.69%	47.70%	47.70%	47.70%	47.70%	47.70%
Other Revenue									
Other Revenue (In app purchases)		2.00	6.92	18.54	27.81	41.71	62.57	93.85	140.78
Other Revenue Growth			246%	168%	50%	50%	50%	50%	50%
Total Revenue	70.76	161.70	250.77	369.50	654.21	1050.07	2398.67	3584.18	5400.78
Total Revenue Growth		128.51%	55.09%	47.34%	77.05%	60.51%	128.43%	49.42%	50.68%

Assumptions Summary

Notes	DEC '19	DEC '20	DEC '21	DEC '22	Average	DEC '23	DEC '24	DEC '25	DEC '26	DEC '27	Rationale
Trends/ Assumptions											
Implied tax rate	0.00%	-0.45%	-0.30%	-1.60%	-0.59%	21%	21%	21%	21%	21%	21% American corporate tax rate
Year on year sales growth		128.52%	55.08%	47.35%	76.98%	77.05%	60.51%	128.43%	49.42%	50.68%	Revenue breakdown
COGS as % of sales	28.42%	27.38%	26.78%	26.67%	27.31%	27.04%	27.04%	27.04%	27.04%	27.04%	Maintenance assumption
SG&A as % of sales	88.04%	80.95%	94.50%	89.48%	88.24%	70.31%	60.31%	49.31%	44.81%	42.30%	Decrease as paid subscribers increase
D&A as % of last year's Net PPE and intangibles	8.01%	13.45%	6.63%	10.14%	9.56%	9.56%	9.56%	9.56%	9.56%	9.56%	Maintenance assumption
CAPEX as % of last year's sales	-7.42%	-2.49%	-2.48%	-2.74%	-3.78%	-3.78%	-3.78%	-3.78%	-3.78%	-3.78%	Maintenance assumption
CAPEX	-5.25	-4.02	-6.21	-10.12	-6.40	-10.12	-10.12	-10.12	-6.40	-6.40	Release of new subscription Duolingo Max and developments in Duolingo maths and music due to finish 2025
Cash & ST investments as % of sales	84.57%	74.51%	220.89%	164.60%	136.14%	71.14%	63.14%	38.14%	33.14%	30.14%	Decrease in proportion as high cash was primarily caused by IPO in 2021
ST receivables as % of sales	23.94%	21.05%	22.88%	22.13%	22.50%	22.50%	22.50%	22.50%	22.50%	22.50%	Maintenance assumption
ST Debt as % of last year's total liabilities		2.69%	4.52%	3.31%	3.50%	3.50%	3.50%	3.50%	3.50%	3.50%	Maintenance assumption
Accounts payable as % of COGS	18.95%	4.97%	11.65%	1.20%	9.19%	9.19%	9.19%	9.19%	9.19%	9.19%	Maintenance assumption
Other current liabilities as % of total current liabilities	85.11%	94.86%	90.54%	96.07%	91.64%	91.64%	91.64%	91.64%	91.64%	91.64%	Maintenance assumption
Pretax income as % of EBIT	105.12%	99.87%	106.88%	90.83%	100.67%	100.67%	100.67%	100.67%	100.67%	100.67%	Maintenance assumption
Check	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	

Income Statement



Income Statement

Sales	70.76	161.7	250.77	369.5		654.22	1050.08	2398.70	3584.23	5400.85	Revenue breakdown
COGS excluding D&A	20.11	44.28	67.15	98.56		176.90	283.95	648.63	969.20	1460.43	
Depreciation & Amortization Expense	1.25	2.26	2.73	4.87		4.59	3.18	1.91	0.76	0.08	Depreciation and amortisation schedule
SG&A Expense	62.3	130.89	236.99	330.62		459.97	633.29	1182.76	1606.04	2284.48	
EBIT (Operating Income)	-12.9	-15.73	-56.1	-64.55		12.75	129.66	565.40	1008.23	1655.87	
Nonoperating Income - Net	0.57	0.3	0.05	6.56	1.87	1.87	1.87	1.87	1.87	1.87	Maintenance assumption
Unusual Expense - Net	1.23	0.28	3.91	0.64	1.515	1.515	1.515	1.515	1.515	1.515	Maintenance assumption
Pretax Income	-13.56	-15.71	-59.96	-58.63		9.37	126.27	562.02	1004.84	1652.48	
Income Taxes	0	0.07	0.18	0.94		2.68	27.23	118.73	211.73	347.73	
Consolidated Net Income	-13.55	-15.78	-60.14	-59.57							
Net Income	-13.55	-15.78	-60.14	-59.57		6.69	99.05	443.28	793.11	1304.75	
EPS (diluted)	-0.38	-0.44	-1.57	-1.51							
Diluted Shares Outstanding	35.89	35.89	38.27	39.47							
EBITDA	-11.65	-13.47	-53.37	-59.68		17.34	132.84	567.31	1008.99	1655.95	

Balance Sheet

Balance Sheet

Cash & Short-Term Investments	59.84	120.49	553.92	608.18		465.4173062	663.0362209	914.8966216	1187.859581	1627.886443	
Short-Term Receivables	16.94	34.04	57.38	81.77		147.203123	236.2762324	539.7254418	806.4769219	1215.230112	
Other Current Assets	2.14	3.86	7.97	7.23	5.3	5.3	5.3	5.3	5.3	5.3	5.3 Maintenance Assumption
Total Current Assets	78.92	158.39	619.27	697.18		617.9204292	904.6124533	1459.922063	1999.636503	2848.416555	
Net Property, Plant & Equipment	13.82	14.5	36.58	35.48		24.61	14.78	5.90	0.60	-4.18	Depreciation and amortisation schedule
Intangible Assets	1.79	2.3	4.57	12.55		8.71	5.23	2.09	0.21	-1.48	Depreciation and amortisation schedule
Deferred Tax Assets	0	0	0	10.25	2,5625	2,5625	2,5625	2,5625	2,5625	2,5625	2,5625 Maintenance Assumption
Other Assets	0.52	0.56	0.89	1.51	0.87	0.87	0.87	0.87	0.87	0.87	0.87 Maintenance Assumption
Total Assets	95.05	175.75	661.31	756.97		654.6720021	928.0592368	1471.33579	2003.887348	2846.189179	
ST Debt & Curr. Portion LT Debt	0.97	1.11	3.34	4.9		7,530960046	5,670550335	6,684757471	9,303003191	11,81252195	
Accounts Payable	3.81	2.2	7.82	1.18		16.26	26.09	59.60	89.06	134.20	
Income Tax Payable	0	0.07	0.11	1.07	0,3125	0,3125	0,3125	0,3125	0,3125	0,3125	0,3125 Maintenance Assumption
Other Current Liabilities	27.32	62.32	107.86	174.62	93.03	93.03	93.03	93.03	93.03	93.03	93.03 Maintenance Assumption
Total Current Liabilities	32.10	65.70	119.13	181.77		117.13	125.11	159.63	191.71	239.36	
Long-Term Debt	9.24	8.13	29.12	23.5		42.26	63.23	103.41	142.93	205.70	205.70 Financing D/E schedule
Deferred Tax Liabilities	0	0	0	9.61	2,4025	2,4025	2,4025	2,4025	2,4025	2,4025	2,4025 Maintenance Assumption
Total Liabilities	41.34	73.83	148.25	214.88		161.80	190.74	265.44	337.05	447.46	
Preferred Stock (Carrying Value)	137.7	182.6	0	0		0	0	0	0	0	0 Assumption that all equity financing moving forward is just common equity
Common Equity	-84	-80.7	513.1	542.1		492.84	737.27	1205.81	1666.73	2398.57	2398.57 Financing D/E schedule
Total Shareholders' Equity	53.7	101.9	513.1	542.1		492.84	737.27	1205.81	1666.73	2398.57	2398.57 Financing D/E schedule
Total Liabilities & Shareholders' Equity	95.0	175.7	661.4	757.0		654.64	928.01	1471.25	2003.77	2846.03	

Free Cash Flow Calculations

FCFF/ Unlevered FCFF

EBIT	-12.9	-15.73	-56.1	-64.55	12.75	129.66	565.40	1008.23	1655.87
Less implied tax	0	0.07	0.18	0.94	2.677749062	27.22848275	118.7340564	211.7276977	347.7322206
Plus depreciation and amortisation	1.25	2.26	2.73	4.87	4.59	3.18	1.91	0.76	0.08
Less capex	-5.25	-4.02	-6.21	-10.12	-10.12	-10.12	-10.12	-6.40	-6.40
Less change in NWC	0	45.87	407.45	15.27	-14.62	278.72	520.78	507.64	801.13
Equals FCF	-6.4	-55.39	-454.79	-65.77	19.16	-183.22	-82.33	283.22	500.68
IRR									32%

Blended DCF

Discounted Cash Flow - perpetuity method

Data reported in USD

	DEC '23	DEC '24	DEC '25	DEC '26	DEC '27
FCF	19.16	-183.22	-82.33	283.22	500.68
Projection Year	1	2	3	4	5
Present Value of FCF	17.55	-153.59	-63.18	199.02	322.12

Sum Of PV Of FCF	321.91
Wacc	9.22%
Terminal Growth Rate	3.18%
Terminal Value	8550.42
Pv Of Terminal Value	5500.97
Enterprise Value	5822.89
(-) Cash	608.18
(+) Debt	28.40
Equity Value	5243.11
Diluted Shares Outstanding	41.54
Implied Share Price	126.23

DCF Blended Valuation	Share Price	Weighting
Perpetuity Approach	\$ 126.23	35%
Exit Multiple Approach	\$ 191.29	65%
Final Share Price	\$ 168.52	100%

Discounted Cash Flow - exit multiple method

Exit EV/EBITDA multiple	7.70
FY27 EBITDA	\$ 1,655.95
Terminal Value	\$12,750.78
PV of Terminal Value	\$ 8,203.31
Sum of PV of FCF	\$ 321.91
Enterprise Value	\$ 8,525.22
(-) Cash	608.18
(+) Debt	28.40
Equity Value	7945.44
Diluted Shares Outstanding	41.54
Implied Share Price	\$ 191.29
Initial share price	\$147
Upside	29.91%

Sensitivity Tables

		WACC (%)				
		\$168.52	7.22%	8.22%	9.22%	10.22%
Terminal Growth rate (%)	1.18%	185.38	169.50	156.34	145.07	135.22
	2.18%	195.86	176.74	161.57	149.00	138.26
	3.18%	211.54	186.84	168.55	154.05	142.05
	4.18%	237.53	201.95	178.28	160.78	146.92
	5.18%	289.01	226.99	192.84	170.17	153.41

		WACC (%)				
		\$168.52	7.22%	8.22%	9.22%	10.22%
Terminal Growth rate (%)	1.18%	26%	15%	6%	-1%	-8%
	2.18%	33%	20%	10%	1%	-6%
	3.18%	44%	27%	14%	5%	-4%
	4.18%	61%	37%	21%	9%	0%
	5.18%	96%	54%	31%	16%	4%

Football Field Analysis

Football Field Analysis

Valuation Method	Minimum	Difference	Maximum	Share Price	Notes
52-Week Trading Range	64.73	103.67	168.40	116.57	Average Between Maximum and Minimum
Broker Consensus	149.00	31.00	180.00	166.30	Retrieved from source
DCF	107.84	150.89	258.73	183.29	Bull case - 30%, Base case - 50%, Bear case - 20%
EV / FY23 EBITDA	17.17	0.46	17.63	17.40	Average Between Maximum and Minimum
EV / FY23 EBIT	16.60	1.17	17.76	17.18	Average Between Maximum and Minimum
Price / FY23 Earnings	1.58	8.32	9.90	5.74	Average Between Maximum and Minimum

Valuation Method	Weight
52-Week Trading Range	0%
Broker Consensus	10%
DCF	90%
EV / FY23 EBITDA	0%
EV / FY23 EBIT	0%
Price / FY23 Earnings	0%
Total	100%
Current Price	147.24
Target Price	181.59
Premium/(Discount)	23.33%

Comparables Valuation

Market data as at 3 September 2023 Data Source: Factset

Data reported in USD

	Share Price (\$/share)	Market Cap (\$m)	Net Debt (\$m)	Ent. Value (\$m)	EV / EBITDA				EV / EBIT				P/E (share price / EPS)				
					FY22 (x)	FY23 (x)	FY24 (x)	FY25 (x)	FY22 (x)	FY23 (x)	FY24 (x)	FY25 (x)	FY22 (x)	FY23 (x)	FY24 (x)	FY25 (x)	
Education Technology Companies																	
	Company Name																
LRN-US																	
	Stride	44.09	1,911	544	1,910	7.0x	5.8x	6.3x	5.8x	10.1x	8.6x	9.1x	8.1x	16.2x	12.5x	13.4x	12.0x
CHGG-US	Chegg	10.64	1,347	788	1,729	15.5x	8.5x	8.1x	7.4x	439.7x	-	-	-	19.4x	9.8x	9.3x	8.8x
PSON-GB	Pearson PLC	10.60	7,745	1,758	8,333	10.7x	8.8x	8.4x	8.0x	16.8x	12.4x	11.5x	10.5x	18.1x	14.8x	13.3x	12.0x
CNGO-US	Cengage Learning Holdings LI, Inc	-	-	2,200	-	-	-	-	-	-	-	-	-	-	-	-	-
KAHOT-NO	Kahoot	3.22	1,638	7	1,542	28.2x	-	-	-	54.2x	-	-	-	94.8x	61.5x	44.7x	34.5x
Total average		17.14	3,160.13	1059.58	3,378.38	15.35	7.70	7.60	7.07	130.20	10.50	10.30	9.30	37.13	24.65	20.18	16.83
Total median		10.62	1,774.60	788.30	1,819.30	13.10	8.50	8.10	7.40	35.50	10.50	10.30	9.30	18.75	13.65	13.35	12.00

Forward Multiples:	Multiples				# Shares	Price (\$/share)			
	Average	Median	Minimum	Maximum		Average	Median	Minimum	Maximum
EV / FY23 EBITDA	7.7x	8.5x	7.7x	8.8x	41.54	17.17	17.51	17.17	17.63
EV / FY23 EBIT	10.5x	10.5x	8.6x	12.4x	41.54	17.18	17.18	16.60	17.76
Price / FY23 Earnings	24.7x	13.7x	9.8x	61.5x	41.54	3.97	2.20	1.58	9.90

Key Financials	FY22	FY23
Net Income	(60)	6.69
EBITDA	(60)	17.34
EBIT	(65)	12.75
Cash	608.18	
Debt	28.40	

Beta regression

Market data as of 1/9/23

Data source: FactSet Fundamentals

Data reported in SUSD

Date	Duolingo Price	Duolingo Return	NASDAQ Price	NASDAQ Return
9/1/2023	146.75	-0.28%	52.5	0.04%
8/31/2023	147.16	-5.17%	52.48	3.94%
7/31/2023	155.19	8.57%	50.49	1.28%
6/30/2023	142.94	-4.43%	49.85	-9.94%
5/31/2023	149.57	9.85%	55.35	-0.04%
4/28/2023	136.16	-4.51%	55.37	1.28%
3/31/2023	142.59	57.05%	54.67	-2.48%
2/28/2023	90.79	-4.92%	56.06	-6.86%
1/31/2023	95.49	34.25%	60.19	-1.89%
12/30/2022	71.13	2.10%	61.35	-10.39%
11/30/2022	69.67	-14.87%	68.46	9.99%
10/31/2022	81.84	-14.06%	62.24	9.81%
9/30/2022	95.23		56.68	

R Square	0.079242
Adjusted R Square	-0.01283
Standard Error	0.066205
Observations	12

ANOVA

	df	SS	MS	F	Significance F
Regression	1	0.003772	0.003772	0.860613	0.375416
Residual	10	0.043831	0.004383		
Total	11	0.047604			

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Intercept	0.000338	0.019774	0.017085	0.986705	-0.04372	0.044397	-0.04372	0.044397
Duolingo Return	-0.08887	0.095798	-0.92769	0.375416	-0.30232	0.12458	-0.30232	0.12458

Beta Comparables

Company	Levered beta	Debt/ equity	Tax rate	Unlevered beta	Target D/E	Relevered beta
Stride	0.09	63%	21.00%	0.06	9%	0.06
Chegg	1.09	108%	21.00%	0.59	9%	0.63
Pearson PLC	0.6	26%	21.00%	0.50	9%	0.53
Cengage Learning Holdings LI, Inc	0.08	-878%	21.00%	-0.01	9%	-0.01
Kahoot	0.41	1%	21.00%	0.41	9%	0.44

Beta	0.33
------	------

Weighted Average Cost of Capital (WACC)

Equity (m)	542.10
Debt (m)	28.40
Weight of Debt	4.98%
After-Tax Cost of Debt	8.06%
Weight of Equity	95.02%
Cost of Equity	9.28%
WACC	9.22%

Cost of debt

Instrument	Rate	Value
Operating Lease Commitments due 2028	12.20%	\$ 40.18
Other commitments due 2023	3.78%	\$ 12.50
Implied pre-tax cost of debt	10.20%	
Implied tax rate	21.00%	
Implied post-tax cost of debt	8.06%	

Cost of equity

CAPM pricing model	
Risk free rate	3.68%
Market risk premium	11.27%
Beta	0.50
Cost of equity	9.28%

Risk free rate	Rate	Weighting
10 Year government bond (5Y average)	2.16%	25%
10 Year government bond (Spot)	4.18%	75%
Overall risk free rate	3.68%	100%

Market risk premium	Rate	Weighting
Historical premium 10Y	8.72%	25%
Market index	12.12%	75%
Overall market risk premium	11.27%	100%

Beta	Beta	Weighting
Comparable companies	0.33	25%
Linear regression	-0.09	25%
Yahoo Finance	0.36	25%
Factset	1.39	25%
Beta	0.50	100%

Cashflow statement

Operating activities

Net Income	-13.55	-15.78	-60.14	-59.57
Depreciation, Depletion & Amortisation	1.25	2.25	2.72	4.87
Depreciation and depletion	0.53	1.62	2.03	3.12
Amortisation of intangible assets	0.72	0.63	0.69	1.75
Other funds	4.95	17.03	40.8	73.82
Funds from operations	-7.35	3.51	-16.61	19.12
changes in working capital	9.5	14.2	25.77	34.56
Accounts receivables	11.97	18.04	30.76	45.72
Accounts Payable	2.43	-1.61	5.62	-6.64
Other Accruals	1.44	6.21	3.71	8.72
Other Assets/Liabilities	-6.34	-8.44	-14.32	-13.24
Net operating Cash flow	2.15	17.71	9.16	53.68

Investing activities

Capital Expenditures	-5.25	-4.02	-6.21	-10.12
Capital Expenditure (Fixed Assets)	-3.77	-3.38	-3.59	-5.56
Capital Expenditure (Other Assets)	-1.48	-0.64	-2.62	-4.56
Net Assets from Acquisitions	0	0	0	-4.05
Purchase/Sale of investments	7.68	0	0	0
Sale/Maturity of investments	7.68	0	0	0
Other Funds	0	0	0	0
Other sources	0	0	0	0
Net operating cash flow	2.43	-4.02	-6.21	-10.12

Financing Activities

Change in capital stock	1.12	2.03	430.47	14.78
Repurchase of common and preferred stock	-0.17	0	-8.2	0
Sale of common and preferred stock	1.29	2.03	438.67	14.78
proceeds from sale of stock	0	0	426.19	0
proceeds from stock options	1.29	2.03	12.48	14.78
Other Funds	29.85	44.92	0	0
Other Sources	29.85	44.92	0	0
Net financing cash flow	32.09	51.01	1299.61	44.34

7.03	91.29	444.52	780.80	1307.11
8.71	15.80	29.03	53.92	101.10
6.08	11.85	23.09	45.01	87.72
2.63	3.95	5.93	8.91	13.38
71.25	140.01	275.14	540.68	1062.50
21.42	45.42	96.30	204.17	432.91
77.82	98.91	336.96	296.21	453.89
65.43	89.07	303.45	266.75	408.75
15.08	9.84	33.51	29.46	45.14
0	0	0	0	0
-2.69	0	0	0	0
99.24	144.33	433.26	500.38	886.80
-10.12	-10.12	-10.12	-6.40	-6.40
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
-10.12	-10.12	-10.12	-6.4	-6.4
112.1	112.1	134.296	172.9115	107.3291667
0	0	0	0	0
114.19	114.19	142.42	198.62	106.70
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
114.19	114.19	142.42	198.62	106.70

Supporting Schedules

Supporting Schedules

Total current assets	78.92	158.39	619.27	697.18	617.9204292	904.6124533	1459.922063	1999.636503	2848.416555
Total current liabilities	32.10	65.70	119.13	181.77	117.13	125.11	159.63	191.71	239.36
NWC	46.82	92.69	500.14	515.41	500.79	779.51	1300.29	1807.93	2609.06
Change in NWC	0	45.87	407.45	15.27	-14.62	278.72	520.78	507.64	801.13
Depr & Amort / NET PPE / Intangibles Schedule									
Opening Net PPE		13.82	14.5	36.58	35.48	24.61	14.78	5.90	0.60
Opening Intangibles		1.79	2.3	4.57	12.55	8.71	5.23	2.09	0.21
Opening Net PPE & Intangibles		15.61	16.8	41.15	48.03	33.32	20.01	7.981226809	0.818344649
CAPEX	-5.25	-4.02	-6.21	-10.12	-10.12	-10.12	-10.12	-6.40	-6.40
Depreciation & Amortisation expense	1.25	2.26	2.73	4.87	4.59	3.18	1.91	0.76	0.08
Closing net PPE & intangibles	15.61	16.8	41.15	48.03	33.32	20.01	7.98	0.82	-5.66
Closing Net PPE				35.48	24.61	14.78	5.90	0.60	-4.18 Closing NPPE maintains same % of Opening (NPPE & Intangibles)
Closing Intangibles				12.55	8.71	5.23	2.09	0.21	-1.48 Closing Intangibles maintains same % of Opening (NPPE & Intangibles)
Closing Net PPE + Intangibles				48.03	33.32	20.01	7.98	0.82	-5.66
Balance Sheet Financing									
Total Assets	95.05	175.75	661.31	756.97	654.6720021	928.0592368	1471.33579	2003.887348	2846.189179
LESS Total Current Liabilities	32.10	65.70	119.13	181.77	117.13	125.11	159.63	191.71	239.36
LESS Total LT Liabilities excl LT Debt	0	0	0	9.61	2.4025	2.4025	2.4025	2.4025	2.4025
Total External Financing Required (D+E)	62.95	110.05	542.18	565.59	535.14	800.55	1309.30	1809.78	2604.43
Financing D/E									
Total External L/T financing	62.95	110.05	542.18	565.59	535.14	800.55	1309.30	1809.78	2604.43
Long-Term debt	9.24	8.13	29.12	23.5	42.26	63.23	103.41	142.93	205.70
Common Equity	-84	-80.7	513.1	542.1	492.84	737.27	1205.81	1666.73	2398.57
Preference Shares	137.7	182.6	0	0	0	0	0	0	0 Assuming all equity financing is common equity
D/E ratio	0.17	0.08	0.06	0.04	0.09	0.09	0.09	0.09	0.09
Long-Term debt / Total Ext Financing	14.68%	7.39%	5.37%	4.15%	7.90%	7.90%	7.90%	7.90%	7.90%
Equity / Total Ext Financing	85.31%	92.59%	94.64%	95.85%	92.10%	92.10%	92.10%	92.10%	92.10%
Depreciation and Amortisation of intangibles schedule									
Depreciation	0.53	1.62	2.03	3.12	6.08	11.85	23.09	45.01	87.72
Amortisation of intangibles	0.72	0.63	0.69	1.75	2.63	3.95	5.93	8.91	13.38
Depreciation growth rate		205.66%	25.31%	53.69% Average	94.89%				
Amortisation of intangibles growth rate		-12.50%	9.52%	153.62% Average	50.22%				
Other funds	4.95	17.03	40.8	73.82	145.07	285.07	560.21	1100.89	2163.39
Funds from Operations	-7.35	3.51	-16.61	19.12	40.54	85.96	182.25	386.43	819.33
Funds from operations growth rate		-147.76%	-573.22%	-215.11% average	-312.03%				
Proceeds from stock options									

Board Members



Board Members

■ Founder
 ■ Independent Director



	Name	Position	Age	Board Tenure (Yrs)	Insider Holdings (%)	Salary	Total Comp.
▼	■ Luis von Ahn, PhD	Chairman, President & Chief Executive Officer	44	12	0.000	\$750,000 ↑	\$765,250 ↓
▼	■ Severin Hacker, PhD	Director & Chief Technology Officer	38	12	0.029	-	-
▼	■ John Lilly	Independent Director	52	2	0.016 ↑	-	-
▼	James H. Shelton, III, MBA	Director	55	3	0.012 ↑	-	-
▼	■ Amy C. Bohutinsky	Independent Director	47	3	0.012 ↑	-	-
▼	■ Sara Clemens	Independent Director	51	3	0.008 ↓	-	-
▼	Laela Sturdy, MBA	board member	45	3	0.012 ↑	-	-
▼	■ Bing Gordon Gordon, MBA	Independent Director	73	3	0.216 ↑	-	-
▼	■ Gillian Munson	Independent Director	52	4	0.008 ↑	-	-
▼	Bing Gordon, MBA	Director	73	9	0.005	-	-
▼	Tanzeen M. Syed	Director	40	-	-	-	-

Source: FactSet People, Ownership

Management Members



TOTAL MEMBERS	Mgmt 9	INDEPENDENT DIRECTORS	AVERAGE AGE Mgmt 45	AVERAGE TENURE Mgmt 7	INSIDER OWNED Mgmt 1.231%
18	Board 11	45%	50 YRS Board 51	5 YRS Board 5	1.520% Board 0.318%

Management

■ Founder

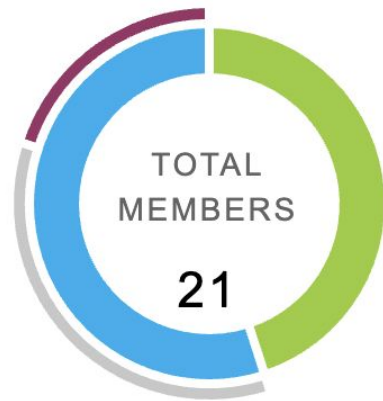


Name	Position	Age	Company Tenure (Yrs)	Insider Holdings (%)	Salary	Total Comp.
▼ ■ Luis von Ahn, PhD	Chairman, President & Chief Executive Officer	44	12	0.000	\$750,000 ↑	\$765,250 ↓
▼ Matthew Skaruppa, MBA	Chief Financial & Accounting Officer	41	3	0.173 ↑	\$629,167 ↑	\$3,822,903 ↑
▼ ■ Severin Hacker, PhD	Director & Chief Technology Officer	38	12	0.029	-	-
▼ Jorge Mazal, MBA	Chief Product Officer	-	6	-	-	-
▼ Robert P. Meese, MBA	Chief Business Officer	46	7	0.584 ↓	\$480,000 ↑	\$2,941,476 ↑
▼ Natalie Glance, PhD	Senior Vice President-Engineering	55	8	0.374 ↓	\$602,917 ↑	\$3,801,653 ↑
▼ Deborah Belevan, CPA	Vice President-Investor Relations	-	-	-	-	-
▼ Molly Lindsay, MBA	Chief People Officer	-	-	-	-	-
▼ Stephen Chen	General Counsel	49	3	0.072 ↓	\$448,125 ↑	\$2,179,040 ↑

Source: FactSet People, Ownership

Management and Board

Management & Board



AVG. TENURE

5.69 Years



Management	9	(45.00%)
Board	11	(55.00%)
Female	4	(36.36%)

Management	7.65
Board	5.6

DUAL ROLE

Yes

CEO/CHAIRMAN

Luis von Ahn, PhD

Male

Proxy Timing/Shareholder Meetings

Duolingo Inc ESG Ranking



ESG Ranking (%)
Compared With
31,646 Companies



13 Sources
for this company



1 Special Issue
Affects This Company

Industry average is for the 2059 companies in Software & Internet industry

Additional Risks



Third Party Risk

Duolingo relies upon the Apple and Android app store and Google play store to distribute their app and are thus impacted by changes in terms and conditions and pricing.

Geographic Risk

Different countries have different laws and regulations and thus Duolingo must be aware of these differing rules to ensure their app can operate globally.

Border Risk

If international borders are put in place this could dampen user base growth as travel demand dampens and thus less people use subscriptions.

Foreign Exchange Risk

Duolingo's operating expenses are denominated in American, German and Chinese currencies. Fluctuations could increase and decrease expenses.

Intellectual Property Risk

Duolingo could be subject to IP litigation and needs to obtain trademarks to preserve their IP which are all time consuming and financially-intensive.

Public Company Risk

Duolingo as a public company now incurs significant expenses and furthermore is subject to the SEC's standards for financial reporting

Expense Drivers

Expense drivers	DEC '19	DEC '20	DEC '21	DEC '22	DEC '23	DEC '24	DEC '25	DEC '26	DEC '27	
Research and Development		53.024	103.79		148.94	249.67	400.74	807.47	1116.95	1602.05
Proportion of revenue						38.16%	38.16%	33.66%	31.16%	29.66%
Bull						37.16%	37.16%	32.66%	30.16%	28.66%
Base		32.79%	41.39%		40.31%	38.16%	38.16%	33.66%	31.16%	29.66%
Bear						39.16%	39.16%	34.66%	32.16%	30.66%
Sales and marketing		34.543	56.610		64.967	81.82	110.33	204.05	269.05	404.88
Proportion of revenue						12.51%	10.51%	8.51%	7.51%	7.50%
Bull						11.51%	9.51%	7.51%	6.51%	6.50%
Base		21.36%	22.57%		17.58%	12.51%	10.51%	8.51%	7.51%	7.50%
Bear						13.51%	11.51%	9.51%	8.51%	8.50%
General and Administrative		43.313	76.590		116.714	\$ 128.48	\$ 122.21	\$ 171.23	\$ 220.02	\$ 277.52
Proportion of revenue						19.64%	11.64%	7.14%	6.14%	5.14%
Bull						18.64%	10.64%	6.14%	5.14%	4.14%
Base		26.79%	30.54%		31.59%	19.64%	11.64%	7.14%	6.14%	5.14%
Bear						20.64%	12.64%	8.14%	7.14%	6.14%
Total SG&A expenses		130.88	236.99		330.62	459.96	633.28	1182.75	1606.02	2284.45
Total SG&A expenses proportion of revenue		80.94%	94.50%		89.48%	70.31%	60.31%	49.31%	44.81%	42.30%