

shareholder letter

Q4 / FY 2022

**our mission is
to develop the
best education
in the world
and make it
universally
available.**



Q4 and FY22 highlights

User Metrics	Q4 2021	Q4 2022
Daily Active Users	10.1M	16.3M +62% YoY
Monthly Active Users	42.4M	60.7M +43% YoY
Paid Subscribers at period end	2.5M	4.2M +67% YoY
Paid Subscriber Penetration as % of MAU*	6.2%	7.8%

Financial Metrics	Q4 2022	FY 2022
Revenue	\$103.8M +42% YoY	\$369.5M +47% YoY
Total Bookings	\$126.4M +39% YoY	\$428.6M +46% YoY
Net Loss	\$(13.9)M	\$(59.6)M
Adjusted EBITDA	\$5.2M 5.0% margin	\$15.5M 4.2% margin

*LTM MAU

Dear shareholders,

We had a “Super” strong finish to 2022, **outperforming our expectations and setting new records for active users and bookings in Q4**. This letter is focused on what we’re looking forward to in 2023, from innovative AI-driven features that drive engagement, to brand-new course content for more advanced English learners. But first, here’s a summary of how we performed in Q4:

Q4 Highlights

- For the sixth quarter in a row, we saw accelerating user growth on Duolingo: DAUs increased 62% to 16.3 million and MAUs increased 43% to 60.7 million, compared to the prior year quarter;
- We added a record number of paid Super Duolingo subscribers, which totaled 4.2 million at the end of Q4, an increase of 67% compared to the prior year quarter, and family plan subscribers now make up over 12% of total subscribers;
- Total bookings grew 39% and revenue grew 42%, compared to the prior year quarter (46% and 47%, respectively, on a constant currency basis);
- Subscription bookings grew 44% compared to the prior year quarter and in-app purchases (IAPs) grew more than 100%.

Before we look ahead to 2023, I want to review what drives our user and bookings growth.

Our Advantage Is Our Great Free Product

Our freemium business model enables us to grow organically and keeps competitors at bay.

We didn’t monetize Duolingo for years after launching it, so we didn’t want to spend to acquire our users. We found that the most cost efficient growth came from making our product so fun and engaging that people would tell their friends and family about it. That strategy worked well, and it’s why 90% of our user growth has been organic and why we feel so strongly that our free product must remain excellent.

The size of our user base is a big part of our data moat. Duolingo has more data on how people learn languages than any other entity in history, and we use that data to improve our effectiveness and engagement. This creates a strong flywheel effect: our product gets better as we get more learner data, and that in turn drives word of mouth growth and increases the amount of data we have.

Having an excellent free product also reduces friction for returning users, who can easily come back after a period of being away. On any given day, **the number of returning users (i.e., those who have been away for more than a month) is roughly the same as the number of brand new users** who come to the platform. Language learning is often a lifelong process, and while learners may take a break, they eventually come back to resume their lessons. And our personalized experience allows them to easily jump back in.

Looking Ahead to 2023

In 2023, in addition to the thousands of A/B tests we normally run to improve our products, we're focused on two emerging opportunities: **generative artificial intelligence (AI)** and **English language learners**.

Since our founding, we have leveraged new technology to help us execute on our mission of making the best education in the world universally available. In 2012, we made the decision to create a mobile-first experience. The smartphone was a seminal change, and betting on it allowed Duolingo to become the company it is today. We now believe that AI is likely to be the next technological sea change.

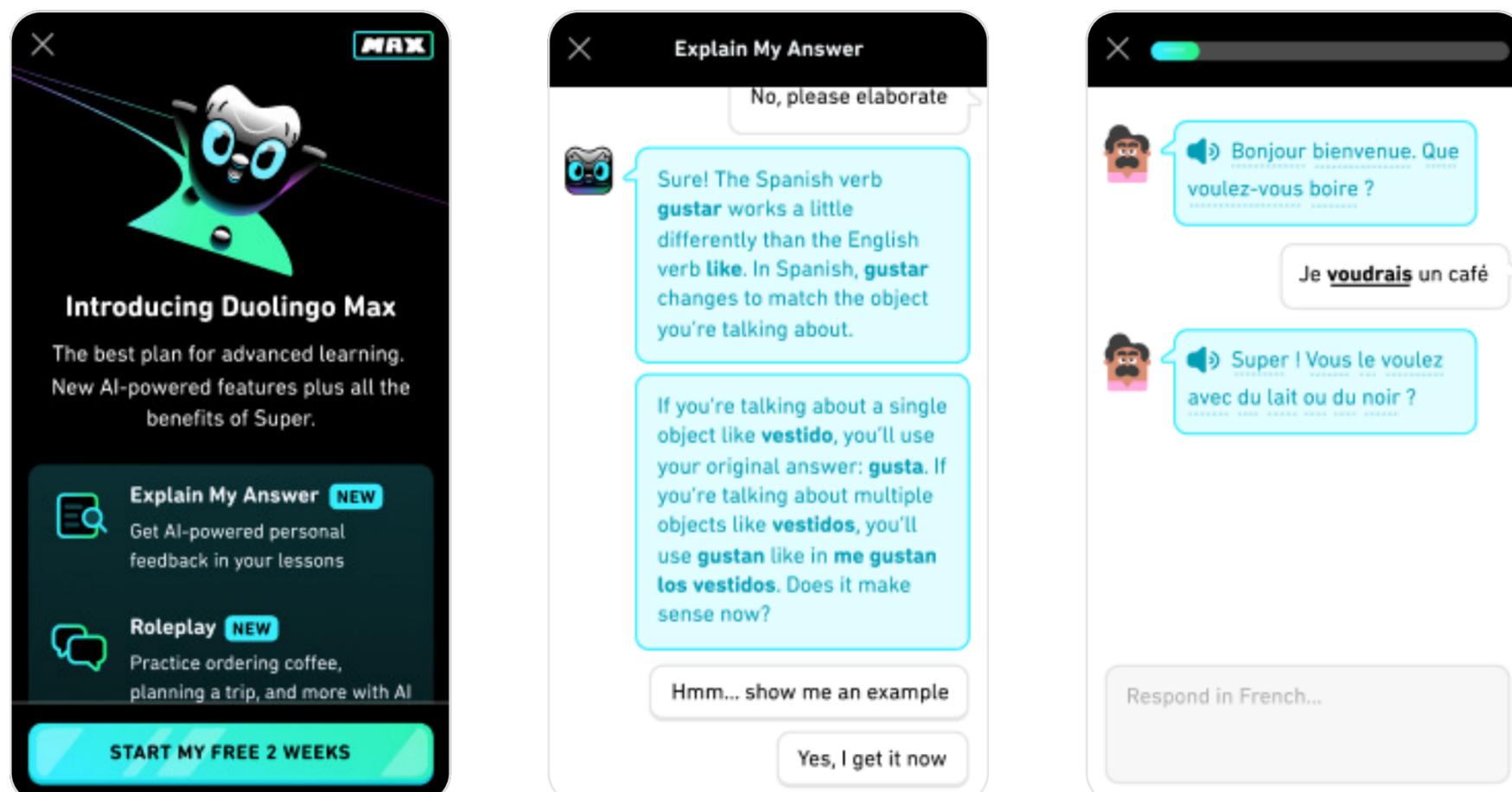
While we have been investing in AI since 2013 to power both the Duolingo language learning app and the Duolingo English Test, the technology has advanced to a level that is within striking distance of our vision to teach as well as a human tutor. As such, we've begun testing a higher subscription tier (above Super Duolingo) with new generative AI features, called Duolingo Max, that is the next step on this path. We worked closely with OpenAI to develop Max features, using an advanced system that is optimized for language learning.

Duolingo Max will offer two powerful features on top of Super Duolingo: **Explain My Answer** and **Roleplay**.

Explain My Answer will provide in-depth explanations, generated by AI, to help learners understand their mistakes in a Duolingo lesson. **Roleplay** will give learners a chance to chat with Duolingo characters in order to help build critical conversation skills. Using AI, we will guide learners through ordering coffee or asking for directions, and give feedback on their progress.

We believe that together, these new features will allow us to get closer to simulating a human tutor while continuing to make Duolingo even more engaging and fun.

We've begun testing Duolingo Max in select markets, and expect to roll it out to more learners throughout 2023.



New Course Content for More Advanced English Learners

The vast majority (nearly 90%) of language learners in the world are learning English, but only about 45% of Duolingo users are doing so. We see a clear opportunity to expand our presence in the English-learning market and drive international monetization by broadening our English learning course offerings.

Currently all Duolingo courses are structured to teach a target language from a base language. For example, our course to teach English for Spanish speakers is different from and more comprehensive than our course to teach English for Arabic speakers. As such, more advanced English learners from Arabic can't benefit as much from Duolingo. To serve learners who already know basic English, we're using generative AI and our unique teaching methods to create intermediate content that we can scale to all of our English courses.

We're excited to better address this market and believe it will unlock incremental user and bookings growth over time.

2023 Financial Profile

In 2022, we grew DAUs by 62%, subscribers by 67%, and bookings by 46%, while our non-GAAP sales & marketing (S&M) expenses only grew by 20%. We saw operating leverage in S&M because our user and bookings growth came, in large part, from our R&D investments in years past. We expense nearly all our R&D spend as it is incurred, but in many ways the improvements that come from our engineers, designers, and product managers become assets that compound over time, paying off for years. That's why we also expect to get leverage in R&D over time.

With over 2 billion people learning languages around the world, we have a huge market opportunity ahead of us. We believe we will continue to grow the top line rapidly as we progress toward our long-term Adjusted EBITDA margin target of 30-35%. This year, we expect to achieve an Adjusted EBITDA margin of 10-12%, up from about 4% in 2022. This implies more than 30% of incremental flow through to Adjusted EBITDA in 2023, with the second half of the year showing even higher incremental profitability.

In Closing

I decided to keep this letter short to focus on the new opportunities we're looking forward to in 2023. In addition to these, we will continue to work on expanding beyond language learning through our literacy and math apps, on the Duolingo English Test, on making Duolingo more social, and on a la carte IAPs, all of which I will update you on in the coming quarters.

Until next time, don't forget to do your daily lessons!



A handwritten signature in black ink, appearing to read 'Luis von Ahn'. The signature is fluid and cursive.

Luis von Ahn
CEO and Co-Founder

financial performance and outlook

Summary of Financial and Key Operating Metrics

(in millions)

	Q4 2021	Q4 2022	YoY
User Metrics			
Monthly active users (MAUs)	42.4	60.7	43%
Daily active users (DAUs)	10.1	16.3	62%
Paid subscribers (period end)	2.5	4.2	67%

	Q4 2021	Q4 2022	YoY	2021	2022	YoY
Operating Metrics						
Total bookings	\$90.8	\$126.4	39%	\$294.2	\$428.6	46%
Subscription bookings	\$69.8	\$100.3	44%	\$224.5	\$331.8	48%

GAAP Financial Metrics

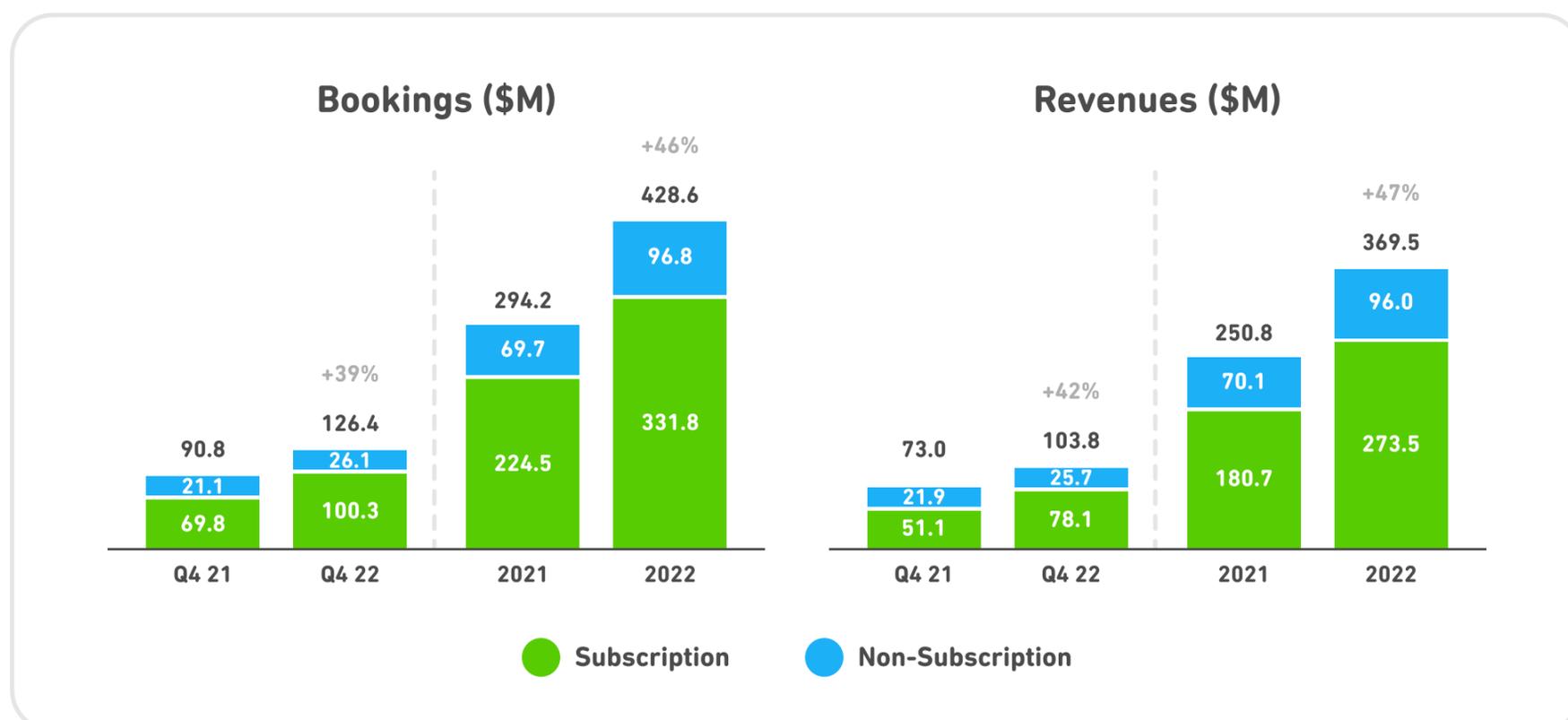
Revenues	\$73.0	\$103.8	42%	\$250.8	\$369.5	47%
Gross profit	\$53.1	\$76.1	43%	\$181.6	\$270.1	49%
Gross margin (%)	72.7%	73.3%	~60 bps	72.4%	73.1%	~70 bps
Net loss	(\$17.5)	(\$13.9)	nm	(\$60.1)	(\$59.6)	nm
Net cash from operating activities	\$0.4	\$11.6	nm	\$9.2	\$53.7	485%

Non-GAAP Financial Metrics (1)

Adjusted EBITDA	\$0.3	\$5.2	nm	(\$1.1)	\$15.5	nm
Free cash flow	\$1.6	\$11.3	592%	\$12.7	\$46.2	262%

(1) Please refer to the Appendix at the end of this letter for a reconciliation of these non-GAAP financial measures to the most directly comparable GAAP financial measure.

Amounts reported in millions are computed based on the amounts in thousands. As a result, the sum of the components reported in millions may not equal the total amount reported in millions due to rounding. In addition, percentages presented are calculated from the underlying numbers in thousands and may not add to their respective totals due to rounding.



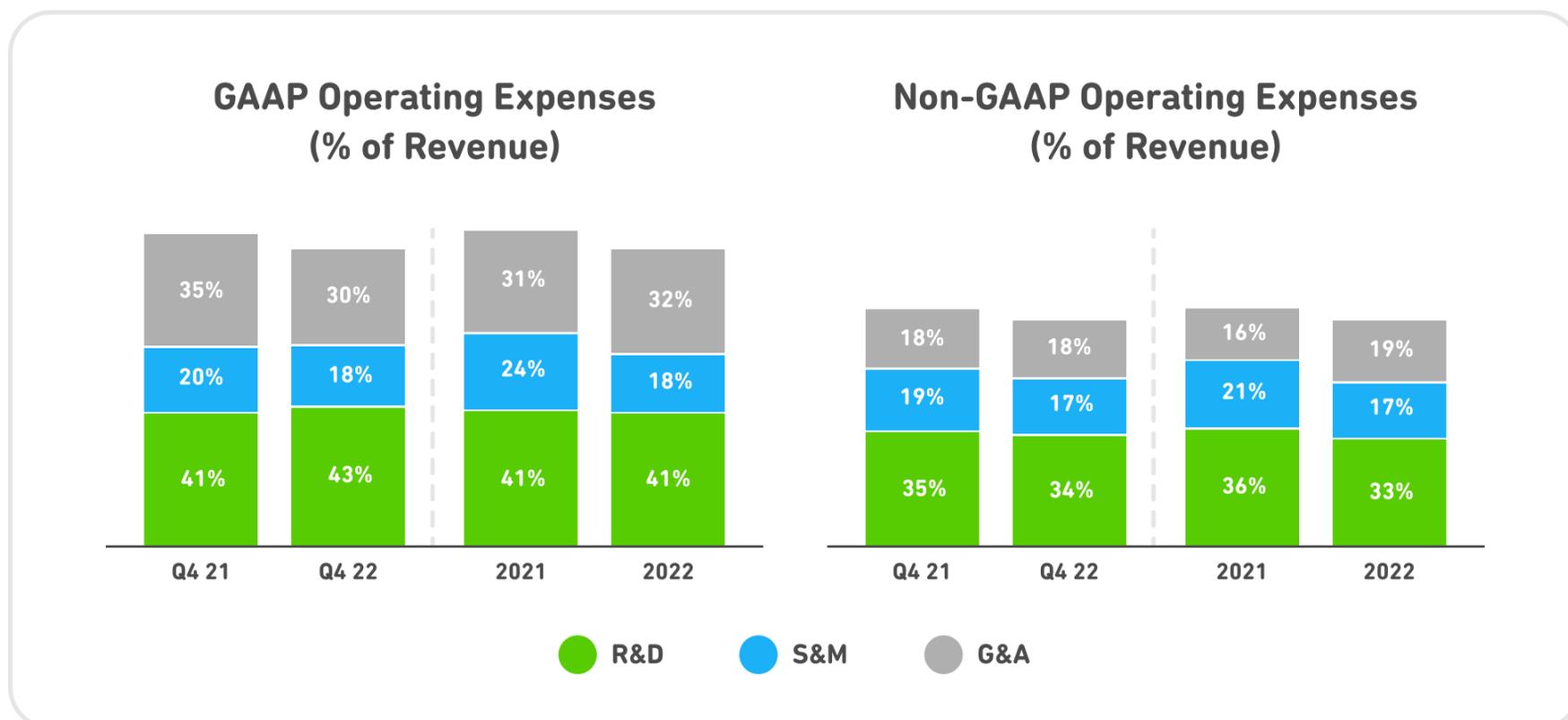
In the fourth quarter, total bookings reached a record high of \$126.4 million, growing 39% year over year on a reported basis (about 46% on a constant currency basis). In 2022, total bookings grew 46% year over year on a reported basis to \$428.6 million (about 52% on a constant currency basis). This was mainly driven by a 48% increase in subscription bookings, which was due to a growing number of first-time and renewal subscriptions. We also continue to see a shift to individual annual and family plan subscriptions, which make up about 79% and over 12% of total subscribers at year end, respectively.

In the fourth quarter, revenues grew 42% year over year on a reported basis to \$103.8 million (about 47% on a constant currency basis). In 2022, revenues grew 47% year over year on a reported basis to \$369.5 million (about 51% on a constant currency basis), driven primarily by growth in subscription revenue, which grew 51% in 2022. The increase in subscription revenue was primarily driven by a higher average number of paid subscribers. The table below provides revenues by product type:

(in millions)	Q4 2021	Q4 2022	% Change	2021	2022	% Change
Subscription	\$51.1	\$78.1	53%	\$180.7	\$273.5	51%
Advertising	11.1	11.1	-	38.5	44.7	16%
Duolingo English Test	8.1	8.4	4%	24.7	32.7	33%
Other *	2.7	6.1	130%	6.9	18.5	168%
Total revenues	\$73.0	\$103.8	42%	\$250.8	\$369.5	47%

Gross margin increased by approximately 60 basis points year over year to 73.3% in Q4, and approximately 70 basis points year over year to 73.1% in 2022. The improvement for both periods was primarily driven by higher subscription margins due to stronger retention and lower fees charged by the Google Play store, and were offset by lower margins in advertising.

*Other primarily includes in-app sales of virtual goods.



We report three categories of operating expenses: Research and development (R&D), Sales and marketing (S&M), and General and administrative (G&A). Non-GAAP operating expenses† represent GAAP expenses adjusted for depreciation, amortization, stock-based compensation, and IPO and public company costs, as well as other expenses. The majority of the adjustments in Q4 and 2022 were for stock-based compensation expense of \$20.6 million and \$73.8 million, respectively. In Q4 and 2022, \$7.3 million and \$31.0 million, respectively, were related to our pre-IPO founder equity awards which are intended to serve as the sole equity award opportunity for our founders through 2031. As a reminder, these founder awards are meant to align our founders' economic interests with those of shareholders because they vest, in part, based upon the achievement of stock price hurdles that, if achieved, would result in significant value creation for our equity holders. However, they are expensed even if none of the stock price hurdles are achieved. The next hurdle would be achieved if our stock price averaged \$178.50 / share for 60 days.

In Q4, GAAP R&D expense increased slightly from 41% to 43% of revenue year over year, primarily due to growth in headcount. In 2022, GAAP R&D expense remained flat year over year at 41% of revenue.

On a non-GAAP basis, we achieved operating leverage in R&D for both Q4 and 2022. In Q4, non-GAAP R&D expense decreased year over year from 35% to 34% and in 2022, non-GAAP R&D expense decreased year over year from 36% to 33% of revenue.

We also continue to achieve leverage in S&M expense on both a GAAP and non-GAAP basis by applying our past learnings in order to spend marketing dollars strategically and acquire users more efficiently in under-penetrated markets. In 2022, GAAP S&M expense decreased year over year from 24% to 18% of revenue, and non-GAAP S&M expense decreased year over year from 21% to 17% of revenue.

In Q4, GAAP G&A expense decreased year over year from 35% to 30% of revenue, and in 2022, this expense increased slightly year over year from 31% to 32% of revenue.

On a non-GAAP basis in Q4, G&A expense remained flat year over year at 18% of revenue. In 2022, non-GAAP G&A increased year over year from 16% to 19% of revenue, driven primarily by increased travel and meals (as COVID restrictions eased), facilities costs (as we built out our new office in Pittsburgh and expanded our NYC office), professional fees (as we had a full year of costs related to being public and only about half a year of those costs in 2021) and web services and technology costs.

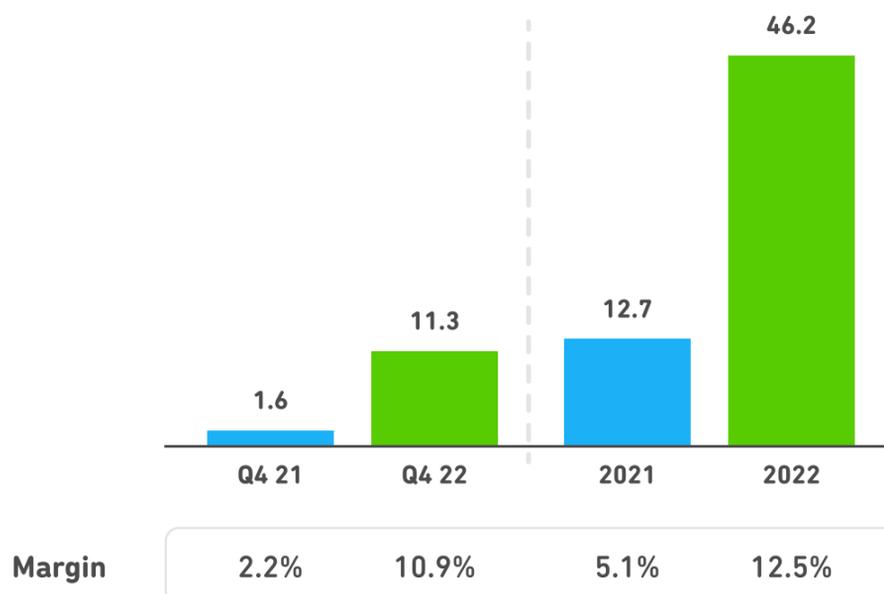
†Please refer to the Appendix at the end of this letter for a reconciliation of these non-GAAP financial measures to the most directly comparable GAAP financial measure.

Adjusted EBITDA (\$M)



As we have since our founding, we continue to manage the business with cost and capital discipline. In Q4, Adjusted EBITDA† increased by \$4.9 million year over year to \$5.2 million, and in 2022, increased \$16.5 million year over year to \$15.5 million. The increase was driven by growth in revenue and gross margin, and improved leverage in operating expenses.

Free Cash Flow (\$M)



During Q4 and FY 2022, we generated \$11.3 million and \$46.2 million in free cash flow†, respectively, driven by an increase in cash from operations. As a reminder, we define free cash flow as net cash provided by operating activities, reduced by capitalized software development costs and purchases of property and equipment, and increased by IPO and public company costs, taxes paid related to stock-based compensation equity awards and other costs, as we believe they are not indicative of future liquidity.

†Please refer to the Appendix at the end of this letter for a reconciliation of these non-GAAP financial measures to the most directly comparable GAAP financial measure.

Q1 and FY 2023 Guidance

Duolingo is providing the following guidance for the first quarter and the full year 2023.

(in millions)	Q1 2023	FY 2023
Bookings	\$127.5 - 130.5	\$530 - 542
YoY Bookings Growth	25% - 28%	24% - 26%
Revenues	\$111 - 114	\$486 - 498
YoY Revenue Growth	37% - 41%	32% - 35%
Adjusted EBITDA	\$10.0 - 11.4	\$48.6 - 59.8
Adjusted EBITDA margin	9% - 10%	10% - 12%

With regards to the Non-GAAP Adjusted EBITDA and Adjusted EBITDA margin outlook provided above, a reconciliation to GAAP net loss, the most directly comparable financial measure presented in accordance with GAAP, has not been provided as the quantification of certain items included in the calculation of GAAP net loss cannot be calculated or predicted at this time without unreasonable efforts. For example, the non-GAAP adjustment for stock-based compensation expenses related to equity awards requires additional inputs such as number of shares granted and market price that are not currently ascertainable, and the non-GAAP adjustment for certain legal, tax and regulatory reserves and expenses depends on the timing and magnitude of these expenses and cannot be accurately forecasted. For the same reasons, we are unable to address the probable significance of the unavailable information, which could have a potentially unpredictable, and potentially significant, impact on our future GAAP financial results.

Video Webcast

Duolingo will host a video webcast to discuss its quarterly and full year results today, February 28, 2023, at 5:30 p.m. ET. This live webcast and related materials will be publicly available and can be accessed at investors.duolingo.com. A replay will be available on the Investor Relations website two hours following completion of the webcast and will remain available for a period of one year.

About Duolingo

Duolingo is the leading mobile learning platform globally. Its flagship app has organically become the world's most popular way to learn languages and the top-grossing app in the Education category on both Google Play and the Apple App Store. With technology at the core of everything it does, Duolingo has consistently invested to provide learners a fun, engaging, and effective learning experience while remaining committed to its mission to develop the best education in the world and make it universally available.

Definitions

Subscription Bookings and Total Bookings. Subscription bookings represent the amounts we receive from a purchase of a subscription to Super Duolingo. Total bookings represent the amounts we receive from a purchase of a subscription to Super Duolingo, a purchase of a Duolingo English Test, an in-app purchase for a virtual good, and from advertising networks for advertisements served to our users. We believe bookings provide an indication of trends in our operating results, including cash flows, that are not necessarily reflected in our revenues because we recognize subscription revenues ratably over the lifetime of a subscription, which is generally from one to twelve months.

Monthly Active Users (MAUs). MAUs are defined as unique Duolingo users who engage with our mobile language learning application or the language learning section of our website each month. MAUs are reported for a measurement period by taking the average of the MAUs for each calendar month in that measurement period. MAUs are a measure of the size of our global active user community on Duolingo.

Daily Active Users (DAUs). DAUs are defined as unique Duolingo users who engage with our mobile language learning application or the language learning section of our website each calendar day. DAUs are reported for a measurement period by taking the average of the DAUs for each day in that measurement period. DAUs are a measure of the consistent engagement of our global user community on Duolingo.

Throughout this document, the measurement period for MAUs and DAUs is the three months ended December 31, 2022 and the same period in the prior year where applicable, and the analysis of results is based on those periods.

Paid Subscribers. Paid subscribers are defined as users who pay for access to Super Duolingo, including subscribers who pay for a family plan, and had an active subscription as of the end of the measurement period. Each unique user account is treated as a single paid subscriber regardless of whether such user purchases multiple subscriptions, and the count of paid subscribers does not include users who are currently on a free trial or who are non-paying members of a family plan.

Limitation of Key Operating Metrics and Other Data

We manage our business by tracking several operating metrics, including MAUs, DAUs, paid subscribers, and bookings. While these metrics are based on what we believe to be reasonable estimates of our user base for the applicable period of measurement, there are inherent challenges in measuring how our platform is used. These metrics are determined by using internal data gathered on an analytics platform that we developed and operate and have not been validated by an independent third party. This platform tracks user account and session activity. If we fail to maintain an effective analytics platform, our metrics calculations may be inaccurate. Because we update the methodologies we employ to create metrics, our operating metrics may not be comparable to those in prior periods. Other companies, including companies in our industry, may calculate these metrics differently.

Non-GAAP Financial Measures

We use certain non-GAAP financial measures to supplement our consolidated financial statements, which are presented in accordance with GAAP. These non-GAAP financial measures include Adjusted EBITDA, Adjusted EBITDA margin, Free cash flow and Free cash flow margin. Please refer to the definitions and reconciliation at the end of this letter. We use these non-GAAP financial measures for financial and operational decision-making and as a means to evaluate period-to-period comparisons. By excluding certain items that may not be indicative of our recurring core operating results, we believe that these non-GAAP financial measures provide meaningful supplemental information regarding our performance. Accordingly, we believe these non-GAAP financial measures are useful to investors and others because they allow for additional information with respect to financial measures used by management in its financial and operational decision-making and they may be used by our institutional investors and the analyst community to help them analyze the health of our business. However, there are a number of limitations related to the use of non-GAAP financial measures, and these non-GAAP measures should be considered in addition to, not as a substitute for or in isolation from, our financial results prepared in accordance with GAAP. Other companies, including companies in our industry, may calculate these non-GAAP financial measures differently or not at all, which reduces their usefulness as comparative measures.

The effect of currency exchange rates on our business is an important factor in understanding period to period comparisons. We use non-GAAP percentage change in constant currency revenues for financial and operational decision-making and as a means to evaluate period-to-period comparisons. Constant currency revenue percentage change is calculated by determining the change in current period revenues over prior year comparable period revenues where current period foreign currency revenues are translated using prior year comparable period exchange rates.

Forward-Looking Statements

This Shareholder Letter contains forward-looking statements within the meaning of the Private Securities Litigation Reform Act of 1995. We intend such forward-looking statements to be covered by the safe harbor provisions for forward-looking statements contained in Section 27A of the Securities Act of 1933, as amended (the "Securities Act") and Section 21E of the Securities Exchange Act of 1934, as amended (the "Exchange Act"). All statements other than statements of historical facts contained in this letter, including without limitation, statements regarding our business model and strategic plans, including the anticipated release of new products and our financial outlook are forward-looking statements. Without limiting the generality of the foregoing, you can identify forward-looking statements because they contain words such as "may," "will," "shall," "should," "expects," "plans," "anticipates," "could," "intends," "target," "projects," "contemplates," "believes," "estimates," "predicts," "potential," "goal," "objective," "seeks," or "continue" or the negative of these words or other similar terms or expressions that concern our expectations, strategy, plans, or intentions. Such forward-looking statements are neither promises nor guarantees, but involve a number of known and unknown risks, uncertainties and assumptions that may cause our actual results, performance or achievements to differ materially from those expressed or implied in the forward-looking statements due to various factors, including, but not limited to: our ability to retain and grow our users and sustain their engagement with our products; competition in the online language learning industry; our limited operating history; our ability to achieve profitability; our ability to manage our growth and operate at such scale; the success of our investments; our reliance on third-party platforms to store and distribute our products and collect revenue; our reliance on third-party hosting and cloud computing providers; our ability to compete for advertisements; acceptance by educational organizations of technology-based education; our ability to access, collect, and use personal data about our users and payers, and to comply with applicable data privacy laws; potential intellectual property-related litigation and proceedings; our ability adequately obtain, protect and maintain our intellectual property rights; and the other important factors more fully detailed under the caption "Risk Factors" in our Quarterly report on Form 10-Q for the quarterly period ended September 30, 2022, as any such factors may be updated from time to time, including, without limitation, our Annual Report on Form 10-K for the fiscal year ended December 31, 2022 and in our other filings with the SEC, accessible on the SEC's website at www.sec.gov and the Investor Relations section of the Company's website at investors.duolingo.com. All forward-looking statements speak only as of the date of this letter. While we may elect to update such forward-looking statements at some point in the future, we disclaim any obligation to do so, even if subsequent events cause our views to change.

Website Information

We routinely post important information for investors on the Investor Relations section of our website, investors.duolingo.com, and also from time to time may use social media channels, including our Twitter account twitter.com/duolingo and our LinkedIn account [linkedin.com/company/duolingo](https://www.linkedin.com/company/duolingo), as an additional means of disclosing public information to investors, the media, and others interested in us. It is possible that certain information we post on our website and on social media could be deemed to be material information, and we encourage investors, the media, and others interested in us to review the business and financial information we post on our website and on the social media channels identified above, in addition to following our press releases, SEC filings, public conference calls, presentations, and webcasts. The information contained on, or that may be accessed through, our website and our social media channels is not incorporated by reference into, and is not a part of, this document.

DUOLINGO INC. AND SUBSIDIARIES
CONDENSED CONSOLIDATED BALANCE SHEETS

(in thousands)	December 31, 2021	December 31, 2022
Cash and cash equivalents	\$553,922	\$608,180
Accounts receivable	33,163	46,728
Deferred cost of revenues	24,219	35,041
Prepaid expenses and other current assets	7,967	7,234
Non-current assets	42,040	50,164
Total Assets	\$661,311	\$747,347
Accounts payable	\$7,818	\$1,177
Deferred revenues	98,267	157,550
Other current liabilities	13,046	23,039
Long-term liabilities	29,124	23,503
Total liabilities	148,255	205,269
Total stockholders' equity	513,056	542,078
Total liabilities, convertible preferred stock and stockholders' equity	\$661,311	\$747,347

DUOLINGO INC. AND SUBSIDIARIES
CONDENSED CONSOLIDATED STATEMENTS OF OPERATIONS AND COMPREHENSIVE LOSS

(in thousands)	Three Months Ended December 31,		Year Ended December 31,	
	2021	2022	2021	2022
Revenues	\$73,014	\$103,824	\$250,772	\$369,495
Cost of revenues	19,952	27,770	69,186	99,431
Gross profit	53,062	76,054	181,586	270,064
Operating expenses:				
Research and development	30,019	44,470	103,833	150,444
Sales and marketing	14,511	19,029	59,170	66,967
General and administrative	25,947	30,707	78,590	117,848
Total operating expenses	70,477	94,206	241,593	335,259
Loss from operations	(17,415)	(18,152)	(60,007)	(65,195)
Other (expense) income, net	(6)	665	30	(676)
Loss before interest income and provision for income taxes	(17,421)	(17,487)	(59,977)	(65,871)
Interest income	12	4,273	19	7,235
Loss before provision for income taxes	(17,409)	(13,214)	(59,958)	(58,636)
Provision for income taxes	108	716	177	938
Net loss and comprehensive loss	\$(17,517)	\$(13,930)	\$(60,135)	\$(59,574)

DUOLINGO INC. AND SUBSIDIARIES
CONDENSED CONSOLIDATED STATEMENTS OF CASH FLOWS

(in thousands)	Year Ended December 31,	
	2021	2022
Net loss	\$(60,135)	\$(59,574)
Adjustments to reconcile net loss to net cash provided by operating activities:		
Depreciation and amortization	2,726	4,870
Stock-based compensation	40,804	73,820
Changes in assets and liabilities	25,775	34,540
Net cash provided by operating activities	9,170	53,656
Net cash used for investing activities	(6,206)	(14,174)
Net cash provided by financing activities	430,468	14,776
Net increase in cash and cash equivalents	433,432	54,258
Cash and cash equivalents - Beginning of period	120,490	553,922
Cash and cash equivalents - End of period	\$553,922	\$608,180

appendix

Reconciliation: Adjusted EBITDA and Adjusted EBITDA Margin

Adjusted EBITDA is defined as net loss excluding interest (income) expense, net, income tax provision, depreciation and amortization, stock-based compensation expenses related to equity awards, Initial Public Offering ("IPO") and public company costs and transaction costs related to an acquisition, tender offer-related costs and other expenses. Adjusted EBITDA margin is defined as Adjusted EBITDA as a percentage of revenues. These non-GAAP financial measures are used by management to evaluate the financial performance of our business and we present these non-GAAP financial measures because we believe that they are helpful in highlighting trends in our operating results and that they are frequently used by analysts, investors and other interested parties to evaluate companies in our industry. The following table presents a reconciliation of our net loss, the most directly comparable financial measure presented in accordance with GAAP, to Adjusted EBITDA and Adjusted EBITDA margin.

(in thousands)	Q4 2021	Q4 2022	2021	2022
Net Income (Loss)	\$(17,517)	\$(13,930)	\$(60,135)	\$(59,574)
Less: Interest income	(12)	(4,273)	(19)	(7,235)
Plus: Provision for income taxes	108	716	177	938
Plus: Depreciation & amortization	757	1,444	2,726	4,870
Plus: Stock-based compensation expenses related to equity awards (1)	16,337	21,105	42,457	75,822
Plus: IPO and public company costs (2)	656	-	3,909	338
Plus: Acquisition transaction costs (3)	-	8	-	185
Plus: Acquisition earn-out costs (4)	-	113	-	113
Plus: Tender offer-related costs (5)	-	-	5,599	-
Plus: Other expenses (6)	-	-	4,220	-
Adjusted EBITDA	\$329	\$5,183	\$(1,066)	\$15,457
Revenues	\$73,014	\$103,824	\$250,772	\$369,495
Adjusted EBITDA margin	0.5%	5.0%	(0.4)%	4.2%

Reconciliation: Free Cash Flow and Free Cash Flow Margin

Free cash flow represents net cash provided by operating activities, reduced by capitalized software development costs and purchases of property and equipment, and increased by IPO and public company costs, transaction costs related to an acquisition, taxes paid related to stock-based compensation equity awards and other costs, as we believe they are not indicative of future liquidity. Free cash flow margin is defined as Free cash flow as a percentage of revenues. We believe that free cash flow is a measure of liquidity that provides useful information to our management, investors and others in understanding and evaluating the strength of our liquidity and future ability to generate cash that can be used for strategic opportunities or investing in our business. Free cash flow has certain limitations in that it does not represent our residual cash flow for discretionary expenditures and our non-discretionary commitments. The following table presents a reconciliation of net cash provided by operating activities, the most directly comparable financial measure calculated in accordance with GAAP, to free cash flow.

(in thousands)	Q4 2021	Q4 2022	2021	2022
Net cash provided by operating activities	\$432	\$11,608	\$9,170	\$53,656
Less: Capitalized software development costs	(585)	(603)	(2,620)	(4,562)
Less: Purchases of property and equipment	(523)	(292)	(3,586)	(5,562)
Plus: Taxes paid related to stock-based compensation equity awards	1,653	473	1,653	2,002
Plus: IPO and public company costs (2)	656	-	3,909	338
Plus: Acquisition transaction costs (3)	-	8	-	185
Plus: Acquisition earn-out costs (4)	-	113	-	113
Plus: Other (6)	-	-	4,220	-
Free cash flow	\$1,633	\$11,307	\$12,746	\$46,170
Revenues	\$73,014	\$103,824	\$250,772	\$369,495
Free cash flow margin	2.2%	10.9%	5.1%	12.5%

(1) In addition to stock-based compensation expense, this includes costs incurred related to taxes paid on equity transactions.

(2) IPO and public company costs include costs associated with IPO readiness incurred in 2021 and costs associated with the establishment of our public company structure and processes, including consultant costs, a one-time fee associated with the set-up of our initial proxy statement, and fees paid to consultants and Deloitte for work in connection with remediation of the material weakness disclosed in our Annual Report on Form 10-K for the fiscal year ended December 31, 2021.

(3) Represents costs incurred related to an acquisition including due diligence, valuation and integration costs.

(4) Represent costs incurred related to the earn-out payment on the acquisition.

(5) Includes costs related to our tender offer initiated in February 2021.

(6) Represents one-time cash awards to Duolingo contributors under our non-employee volunteer program.

Reconciliation: GAAP to Non-GAAP Operating Expense

(in thousands)	Q4 2021	Q4 2022	2021	2022
Total GAAP Operating Expense	\$70,477	\$94,206	\$241,593	\$335,259
Less: Depreciation & Amortization	(757)	(1,121)	(2,726)	(4,000)
Less: Stock-based Compensation	(14,684)	(20,621)	(40,796)	(73,782)
Less: Other Adjustments	(2,309)	(594)	(15,371)	(2,638)
Non-GAAP Operating Expense	\$52,727	\$71,870	\$182,700	\$254,839

Reconciliation: GAAP to Non-GAAP R&D Expense

(in thousands)	Q4 2021	Q4 2022	2021	2022
Total GAAP R&D Expense	\$30,019	\$44,470	\$103,833	\$150,444
Less: Depreciation & Amortization	(127)	(276)	(260)	(1,500)
Less: Stock-based Compensation	(3,549)	(8,938)	(9,298)	(26,373)
Less: Other Adjustments	(631)	(115)	(3,979)	(701)
Non-GAAP R&D Expense	\$25,712	\$35,141	\$90,296	\$121,870

Reconciliation: GAAP to Non-GAAP S&M Expense

(in thousands)	Q4 2021	Q4 2022	2021	2022
Total GAAP S&M Expense	\$14,511	\$19,029	\$59,170	\$66,967
Less: Depreciation & Amortization	(224)	(290)	(725)	(1,072)
Less: Stock-based Compensation	(333)	(811)	(881)	(2,540)
Less: Other Adjustments	(53)	(8)	(4,905)	(45)
Non-GAAP S&M Expense	\$13,901	\$17,920	\$52,659	\$63,310

Reconciliation: GAAP to Non-GAAP G&A Expense

(in thousands)	Q4 2021	Q4 2022	2021	2022
Total GAAP G&A Expense	\$25,947	\$30,707	\$78,590	\$117,848
Less: Depreciation & Amortization	(406)	(555)	(1,741)	(1,428)
Less: Stock-based Compensation	(10,802)	(10,872)	(30,617)	(44,869)
Less: Other Adjustments	(1,625)	(471)	(6,487)	(1,892)
Non-GAAP G&A Expense	\$13,114	\$18,809	\$39,745	\$69,659

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