ITEM 2. PROPERTIES

Our headquarters are located in Mountain View, California. We own and lease office facilities and data centers around the world, primarily in North America, Europe, and Asia. We believe our existing facilities are in good condition and suitable for the conduct of our business.

ITEM 3. LEGAL PROCEEDINGS

For a description of our material pending legal proceedings, see Legal Matters in Note 10 of the Notes to Consolidated Financial Statements included in Part II, Item 8 of this Annual Report on Form 10-K, which is incorporated herein by reference.

ITEM 4. MINE SAFETY DISCLOSURES

Not applicable.

PART II

ITEM 5. MARKET FOR REGISTRANT'S COMMON EQUITY, RELATED STOCKHOLDER MATTERS, AND ISSUER PURCHASES OF EQUITY SECURITIES

As of October 2, 2015, Alphabet Inc. became the successor issuer of Google Inc. pursuant to Rule 12g-3(a) under the Exchange Act. Our Class A stock has been listed on the Nasdaq Global Select Market under the symbol "GOOG" since August 19, 2004 and under the symbol "GOOGL" since April 3, 2014. Prior to August 19, 2004, there was no public market for our stock. Our Class B stock is neither listed nor traded. Our Class C stock has been listed on the Nasdaq Global Select Market under the symbol "GOOG" since April 3, 2014.

Holders of Record

As of December 31, 2022, there were approximately 6,670 and 1,657 stockholders of record of our Class A stock and Class C stock, respectively. Because many of our shares of Class A stock and Class C stock are held by brokers and other institutions on behalf of stockholders, we are unable to estimate the total number of stockholders represented by these record holders. As of December 31, 2022, there were approximately 64 stockholders of record of our Class B stock.

Dividend Policy

We have never declared or paid any cash dividend on our common or capital stock. The primary use of capital continues to be to invest for the long-term growth of the business. We regularly evaluate our cash and capital structure, including the size, pace, and form of capital return to stockholders.

Issuer Purchases of Equity Securities

The following table presents information with respect to Alphabet's repurchases of Class A and Class C stock during the quarter ended December 31, 2022:

Period	Total Number of Class A Shares Purchased (in thousands)(1)	Total Number of Class C Shares Purchased (in thousands)(1)	Average Price Paid per Class A Share(2)	Average Price Paid per Class C Share(2)	Total Number of Shares Purchased as Part of Publicly Announced Programs (in thousands)(1)	Approximate Dollar Value of Shares that May Yet Be Purchased Under the Program (in millions)
October 1 - 31	8,585	46,059	$ 98.92	$ 99.16	54,644	$ 38,069
November 1 - 30	1,968	55,374	$ 95.89	$ 93.51	57,342	$ 32,703
December 1 - 31	4,687	44,649	$ 91.93	$ 93.93	49,336	$ 28,079
Total	15,240	146,082			161,322	

(1) The repurchases are being executed from time to time, subject to general business and market conditions and other investment opportunities, through open market purchases or privately negotiated transactions, including through Rule 10b5-1 plans. The repurchase program does not have an expiration date. See Note 11 of the Notes to Consolidated Financial Statements included in Item 8 of this Annual Report on Form 10-K for additional information related to share repurchases.

(2) Average price paid per share includes costs associated with the repurchases.

ITEM 7. MANAGEMENT'S DISCUSSION AND ANALYSIS OF FINANCIAL CONDITION AND RESULTS OF OPERATIONS

Please read the following discussion and analysis of our financial condition and results of operations together with "Note about Forward-Looking Statements," Part I, Item 1 "Business," Part I, Item 1A "Risk Factors," and our consolidated financial statements and related notes included under Item 8 of this Annual Report on Form 10-K.

We have omitted discussion of 2020 results where it would be redundant to the discussion previously included in Item 7 of our 2021 Annual Report on Form 10-K.

Understanding Alphabet's Financial Results

Alphabet is a collection of businesses — the largest of which is Google. We report Google in two segments, Google Services and Google Cloud; we also report all non-Google businesses collectively as Other Bets. For further details on our segments, see Part I, Item 1 "Business" and Note 15 of the Notes to Consolidated Financial Statements included in Item 8 of this Annual Report on Form 10-K.

Trends in Our Business and Financial Effect

The following long-term trends have contributed to the results of our consolidated operations, and we anticipate that they will continue to affect our future results:

- **Users' behaviors and advertising continue to shift online as the digital economy evolves.**

The continuing shift from an offline to online world has contributed to the growth of our business and our revenues since inception. We expect that this shift to an online world will continue to benefit our business and our revenues, although at a slower pace than we have experienced historically, in particular after the outsized growth in our advertising revenues during the COVID-19 pandemic. In addition, we face increasing competition for user engagement and advertisers, which may affect our revenues.

- **Users continue to access our products and services using diverse devices and modalities, which allows for new advertising formats that may benefit our revenues but adversely affect our margins.**

Our users are accessing the Internet via diverse devices and modalities, such as smartphones, wearables, and smart home devices, and want to be able to be connected no matter where they are or what they are doing. We are focused on expanding our products and services to stay in front of these trends in order to maintain and grow our business.

We benefit from advertising revenues generated from different channels, including mobile, and newer advertising formats. The margins from these channels and newer products have generally been lower than those from traditional desktop search. Additionally, as the market for a particular device type or modality matures, our advertising revenues may be affected. For example, growth in the global smartphone market has slowed due to various factors, including increased market saturation in developed countries, which can affect our mobile advertising revenues.

We expect TAC paid to our distribution partners and Google Network partners to increase as our revenues grow and TAC as a percentage of our advertising revenues ("TAC rate") to be affected by changes in device mix; geographic mix; partner mix; partner agreement terms; the percentage of queries channeled through paid access points; product mix; the relative revenue growth rates of advertising revenues from different channels; and revenue share terms.

We expect these trends to continue to affect our revenues and put pressure on our margins.

- **As online advertising evolves, we continue to expand our product offerings, which may affect our monetization.**

As interactions between users and advertisers change, and as online user behavior evolves, we continue to expand our product offerings to serve these changing needs, which may affect our monetization. For example, revenues from ads on YouTube and Google Play monetize at a lower rate than our traditional search ads. We also may develop new products incorporating AI innovations that could affect our monetization trends. Additionally, when developing new products and services we generally focus first on user experience before prioritizing monetization.

- **As users in developing economies increasingly come online, our revenues from international markets continue to increase, and may require continued investments. In addition, movements in foreign exchange rates affect such revenues.**

The shift to online, as well as the advent of the multi-device world, has brought opportunities outside of the U.S., including in emerging markets, such as India. We continue to invest heavily and develop localized versions of our products and advertising programs relevant to our users in these markets. This has led to a trend of increased revenues from emerging markets. We expect that our results will continue to be affected by our performance in these markets, particularly as low-cost mobile devices become more available. This trend could affect our revenues as developing markets initially monetize at a lower rate than more mature markets.

International revenues represent a significant portion of our revenues and are subject to fluctuations in foreign currency exchange rates relative to the U.S. dollar. While we have a foreign exchange risk management program designed to reduce our exposure to these fluctuations, this program does not fully offset their effect on our revenues and earnings.

- **The revenues that we derive from non-advertising products and services are increasing and may adversely affect our margins.**

Non-advertising revenues have grown over time, and we expect this trend to continue as we focus on expanding our products and services. The margins on these revenues vary significantly and are generally lower than the margins on our advertising revenues. In particular margins on our hardware products adversely affect our consolidated margins due to pressures on pricing and higher cost of sales.

- **As we continue to serve our users and expand our businesses, we will invest heavily in operating and capital expenditures.**

We continue to make significant research and development investments in areas of strategic focus as we seek to develop new, innovative offerings and improve our existing offerings across our businesses. We also expect to continue to invest in our technical infrastructure, including servers, network equipment, and data centers, to support the growth of our business and our long-term initiatives, in particular in support of AI. In addition acquisitions and strategic investments contribute to the breadth and depth of our offerings, expand our expertise in engineering and other functional areas, and build strong partnerships around strategic initiatives. For example, in September 2022 we closed the acquisition of Mandiant to help expand our offerings in dynamic cyber defense and response.

- **We face continuing changes in regulatory conditions, laws, and public policies, which could affect our business practices and financial results.**

Changes in social, political, economic, tax, and regulatory conditions or in laws and policies governing a wide range of topics and related legal matters have resulted in fines and caused us to change our business practices. As these global trends continue, our cost of doing business may increase, our ability to pursue certain business models or offer certain products or services may be limited, and we may need to change our business practices. Examples include the antitrust complaints filed by the U.S. Department of Justice and a number of state Attorneys General; pending litigation in the U.S., EU, and around the world that could diminish or eliminate safe harbor protection for websites and online platforms; and the Digital Markets Act and Digital Services Act in Europe and various legislative proposals in the U.S. focused on large technology platforms. For additional information see Item 1A Risk Factors and Legal Matters in Note 10 of the Notes to Consolidated Financial Statements included in Part II, Item 8.

- **Our employees are critical to our success and we expect to continue investing in them.**

Our employees are among our best assets and are critical for our continued success. We expect to continue hiring talented employees around the globe and to provide competitive compensation programs. For additional information see Culture and Workforce in Part I, Item 1 "Business."

Revenues and Monetization Metrics

We generate revenues by delivering relevant, cost-effective online advertising; cloud-based solutions that provide enterprise customers of all sizes with infrastructure and platform services as well as communication and collaboration tools; sales of other products and services, such as apps and in-app purchases, and hardware; and fees received for subscription-based products. For details on how we recognize revenue, see Note 1 of the Notes to Consolidated Financial Statements included in Item 8 of this Annual Report on Form 10-K.

In addition to the long-term trends and their financial effect on our business noted above, fluctuations in our revenues have been and may continue to be affected by a combination of factors, including:

- changes in foreign currency exchange rates;
- changes in pricing, such as those resulting from changes in fee structures, discounts, and customer incentives;
- general economic conditions and various external dynamics, including geopolitical events, regulations, and other measures and their effect on advertiser, consumer, and enterprise spending;
- new product and service launches; and

- seasonality.

Additionally, fluctuations in our revenues generated from advertising ("Google advertising"), revenues from other sources ("Google other revenues"), Google Cloud, and Other Bets revenues have been and may continue to be affected by other factors unique to each set of revenues, as described below.

Google Services

Google Services revenues consist of Google advertising as well as Google other revenues.

Google Advertising

Google advertising revenues are comprised of the following:

- Google Search & other, which includes revenues generated on Google search properties (including revenues from traffic generated by search distribution partners who use Google.com as their default search in browsers, toolbars, etc.), and other Google owned and operated properties like Gmail, Google Maps, and Google Play;
- YouTube ads, which includes revenues generated on YouTube properties; and
- Google Network, which includes revenues generated on Google Network properties participating in AdMob, AdSense, and Google Ad Manager.

We use certain metrics to track how well traffic across various properties is monetized as it relates to our advertising revenues: paid clicks and cost-per-click pertain to traffic on Google Search & other properties, while impressions and cost-per-impression pertain to traffic on our Google Network properties.

Paid clicks represent engagement by users and include clicks on advertisements by end-users on Google search properties and other Google owned and operated properties including Gmail, Google Maps, and Google Play. Cost-per-click is defined as click-driven revenues divided by our total number of paid clicks and represents the average amount we charge advertisers for each engagement by users.

Impressions include impressions displayed to users on Google Network properties participating primarily in AdMob, AdSense, and Google Ad Manager. Cost-per-impression is defined as impression-based and click-based revenues divided by our total number of impressions, and represents the average amount we charge advertisers for each impression displayed to users.

As our business evolves, we periodically review, refine, and update our methodologies for monitoring, gathering, and counting the number of paid clicks and the number of impressions, and for identifying the revenues generated by the corresponding click and impression activity.

Fluctuations in our advertising revenues, as well as the change in paid clicks and cost-per-click on Google Search & other properties and the change in impressions and cost-per-impression on Google Network properties and the correlation between these items have been and may continue to be affected by additional factors, such as:

- advertiser competition for keywords;
- changes in advertising quality, formats, delivery or policy;
- changes in device mix;
- seasonal fluctuations in internet usage, advertising expenditures, and underlying business trends, such as traditional retail seasonality; and
- traffic growth in emerging markets compared to more mature markets and across various verticals and channels.

Google Other

Google other revenues are comprised of the following:

- Google Play, which includes sales of apps and in-app purchases;
- hardware, which includes sales of Fitbit wearable devices, Google Nest home products, and Pixel devices;
- YouTube non-advertising, which includes subscription revenues from services such as YouTube Premium and YouTube TV; and
- other products and services.

Fluctuations in our Google other revenues have been and may continue to be affected by additional factors, such as changes in customer usage and demand, number of subscribers, and fluctuations in the timing of product launches.

Google Cloud

Google Cloud revenues are comprised of the following:

- Google Cloud Platform, which includes fees for infrastructure, platform, and other services;
- Google Workspace, which includes fees for cloud-based communication and collaboration tools for enterprises, such as Gmail, Docs, Drive, Calendar and Meet; and
- other enterprise services.

Fluctuations in our Google Cloud revenues have been and may continue to be affected by additional factors, such as customer usage.

Other Bets

Revenues from Other Bets are generated primarily from the sale of health technology and internet services.

Costs and Expenses

Our cost structure has two components: cost of revenues and operating expenses. Our operating expenses include costs related to R&D, sales and marketing, and general and administrative functions. Certain of our costs and expenses, including those associated with the operation of our technical infrastructure as well as components of our operating expenses, are generally less variable in nature and may not correlate to changes in revenue.

Cost of Revenues

Cost of revenues is comprised of TAC and other costs of revenues.

- TAC includes:
    - Amounts paid to our distribution partners who make available our search access points and services. Our distribution partners include browser providers, mobile carriers, original equipment manufacturers, and software developers.
    - Amounts paid to Google Network partners primarily for ads displayed on their properties.
- Other cost of revenues includes:
    - Content acquisition costs, which are payments to content providers from whom we license video and other content for distribution on YouTube and Google Play (we pay fees to these content providers based on revenues generated or a flat fee).
    - Expenses associated with our data centers (including bandwidth, compensation expenses, depreciation, energy, and other equipment costs) as well as other operations costs (such as content review as well as customer and product support costs).
    - Inventory and other costs related to the hardware we sell.

TAC as a percentage of revenues generated from ads placed on Google Network properties are significantly higher than TAC as a percentage of revenues generated from ads placed on Google Search & other properties, because most of the advertiser revenues from ads served on Google Network properties are paid as TAC to our Google Network partners.

Operating Expenses

Operating expenses are generally incurred during our normal course of business, which we categorize as either R&D, sales and marketing, or general and administrative.

The main components of our R&D expenses are:

- compensation expenses for engineering and technical employees responsible for R&D related to our existing and new products and services;
- depreciation; and
- third-party services fees primarily relating to consulting and outsourced services in support of our engineering and product development efforts.

The main components of our sales and marketing expenses are:

- compensation expenses for employees engaged in sales and marketing, sales support, and certain customer service functions; and
- spending relating to our advertising and promotional activities in support of our products and services.

The main components of our general and administrative expenses are:

- compensation expenses for employees in finance, human resources, information technology, legal, and other administrative support functions;
- expenses relating to legal matters, including fines and settlements; and
- third-party services fees, including audit, consulting, outside legal, and other outsourced administrative services.

Other Income (Expense), Net

Other income (expense), net primarily consists of interest income (expense), the effect of foreign currency exchange gains (losses), net gains (losses) and impairment on our marketable and non-marketable securities, performance fees, and income (loss) and impairment from our equity method investments.

For additional details, including how we account for our investments and factors that can drive fluctuations in the value of our investments, see Note 1 and Note 3 of the Notes to Consolidated Financial Statements included in Part II, Item 8 of this Annual Report on Form 10-K as well as Item 7A, “Quantitative and Qualitative Disclosures About Market Risk”.

Provision for Income Taxes

Provision for income taxes represents the estimated amount of federal, state, and foreign income taxes incurred in the U.S. and the many jurisdictions in which we operate. The provision includes the effect of reserve provisions and changes to reserves that are considered appropriate as well as the related net interest and penalties.

For additional details, including a reconciliation of the U.S. federal statutory rate to our effective tax rate, see Note 14 of the Notes to Consolidated Financial Statements included in Item 8 of this Annual Report on Form 10-K.

Executive Overview

The following table summarizes our consolidated financial results (in millions, except for per share information and percentages):

	Year Ended December 31,			
	2021	2022	$ Change	% Change
Consolidated revenues	$ 257,637	$ 282,836	$ 25,199	10 %
Change in consolidated constant currency revenues[1]				14 %
Cost of revenues	$ 110,939	$ 126,203	$ 15,264	14 %
Operating expenses	$ 67,984	$ 81,791	$ 13,807	20 %
Operating income	$ 78,714	$ 74,842	$ (3,872)	(5)%
Operating margin	31 %	26 %		(5)%
Other income (expense), net	$ 12,020	$ (3,514)	$ (15,534)	(129)%
Net income	$ 76,033	$ 59,972	$ (16,061)	(21)%
Diluted EPS	$ 5.61	$ 4.56	$ (1.05)	(19)%

(1) See "Use of Non-GAAP Constant Currency Measures" below for details relating to our use of constant currency information.

- Revenues were $282.8 billion, an increase of 10% year over year, primarily driven by an increase in Google Services revenues of $16.0 billion, or 7%, and an increase in Google Cloud revenues of $7.1 billion, or 37%.
- Total constant currency revenues, which exclude the effect of hedging, increased 14% year over year.

- Cost of revenues was $126.2 billion, an increase of 14% year over year, primarily driven by an increase in other costs of revenues.
- Operating expenses were $81.8 billion, an increase of 20% year over year, primarily driven by increases in compensation expenses due to headcount growth, third-party service fees, and advertising and promotional expenses.

Other information:

- On September 12, 2022, we closed the acquisition of Mandiant for a total purchase price of $6.1 billion and added more than 2,600 employees. Mandiant's financial results are reported within Google Cloud as of the acquisition date. See Note 8 of the Notes to Consolidated Financial Statements included in Item 8 of this Annual Report on Form 10-K for additional information.
- On July 15, 2022, the company executed a 20-for-one stock split with a record date of July 1, 2022, effected in the form of a one-time special stock dividend on each share of the company's Class A, Class B, and Class C stock. All prior period references made to share or per share amounts throughout this Management's Discussion and Analysis of Financial Condition and Results of Operations prior to the effective date have been retroactively adjusted to reflect the effects of the Stock Split. See Note 11 of the Notes to Consolidated Financial Statements included in Item 8 of this Annual Report on Form 10-K for additional information.
- Beginning in the first quarter of 2022, we suspended the vast majority of our commercial activities in Russia and effectively ceased business activities of our Russian entity. The ongoing effect of these direct actions on our financial results was not material. The broader economic effects resulting from the war in Ukraine on our future financial results may be unpredictable.
- Repurchases of Class A and Class C shares were $59.3 billion for the year ended December 31, 2022. See Note 11 of the Notes to Consolidated Financial Statements included in Item 8 of this Annual Report on Form 10-K for additional information.
- Operating cash flow was $91.5 billion for the year ended December 31, 2022.
- Capital expenditures, which primarily reflected investments in technical infrastructure, were $31.5 billion for the year ended December 31, 2022.
- As of December 31, 2022, we had 190,234 employees.

Additionally, looking ahead to fiscal year 2023:

- In January 2023, we announced a reduction of our workforce of approximately 12,000 roles. We expect to incur employee severance and related charges of $1.9 billion to $2.3 billion, the majority of which will be recognized in the first quarter of 2023.

  In addition, we are taking actions to optimize our global office space. As a result we expect to incur exit costs relating to office space reductions of approximately $0.5 billion in the first quarter of 2023. We may incur additional charges in the future as we further evaluate our real estate needs.
- In January 2023, we completed an assessment of the useful lives of our servers and network equipment, resulting in a change in the estimated useful life of our servers and certain network equipment to six years, which we expect to result in a reduction of depreciation of approximately $3.4 billion for the full fiscal year 2023 for assets in service as of December 31, 2022, recorded primarily in cost of revenues and R&D expenses.
- As AI is critical to delivering our mission of bringing our breakthrough innovations into the real world, beginning in January 2023, we will update our segment reporting relating to certain of Alphabet's AI activities. DeepMind, previously reported within Other Bets, will be reported as part of Alphabet's corporate costs, reflecting its increasing collaboration with Google Services, Google Cloud, and Other Bets. Prior periods will be recast to conform to the revised presentation. See Note 15 of the Notes to Consolidated Financial Statements included in Item 8 of this Annual Report on Form 10-K for information relating to our segments.

Financial Results

Revenues

The following table presents revenues by type (in millions):

	Year Ended December 31,	
	2021	2022
Google Search & other	$ 148,951	$ 162,450
YouTube ads	28,845	29,243
Google Network	31,701	32,780
Google advertising	209,497	224,473
Google other	28,032	29,055
Google Services total	237,529	253,528
Google Cloud	19,206	26,280
Other Bets	753	1,068
Hedging gains (losses)	149	1,960
Total revenues	$ 257,637	$ 282,836

Google Services

Google advertising revenues

Google Search & other

Google Search & other revenues increased $13.5 billion from 2021 to 2022. The growth was driven by interrelated factors including increases in search queries resulting from growth in user adoption and usage, primarily on mobile devices; growth in advertiser spending; and improvements we have made in ad formats and delivery. Growth was adversely affected by the unfavorable effect of foreign currency exchange rates.

YouTube ads

YouTube ads revenues increased $398 million from 2021 to 2022. The growth was driven by our brand advertising products followed by direct response products, both of which benefited from increased spending by our advertisers as well as improvements to ad formats and delivery. Growth was adversely affected by the unfavorable effect of foreign currency exchange rates.

Google Network

Google Network revenues increased $1.1 billion from 2021 to 2022. The growth was primarily driven by strength in AdSense and AdMob. Growth was adversely affected by the unfavorable effect of foreign currency exchange rates.

Monetization Metrics

Paid clicks and cost-per-click

The following table presents changes in paid clicks and cost-per-click (expressed as a percentage) from 2021 to 2022:

Paid clicks change	10 %
Cost-per-click change	(1)%

Paid clicks increased from 2021 to 2022 driven by a number of interrelated factors, including an increase in search queries resulting from growth in user adoption and usage, primarily on mobile devices; growth in advertiser spending; and improvements we have made in ad formats and delivery.

Cost-per-click decreased from 2021 to 2022 driven by a number of interrelated factors including changes in device mix, geographic mix, advertiser spending, ongoing product changes, and property mix, as well as the unfavorable effect of foreign currency exchange rates.

Impressions and cost-per-impression

The following table presents changes in impressions and cost-per-impression (expressed as a percentage) from 2021 to 2022:

Impressions change	3 %
Cost-per-impression change	1 %

Impressions increased from 2021 to 2022 primarily driven by Google Ad Manager and AdMob. The increase in cost-per-impression from 2021 to 2022 was driven by a number of interrelated factors including ongoing product and policy changes, improvements we have made in ad formats and delivery, changes in device mix, geographic mix, product mix, and property mix, partially offset by the unfavorable effect of foreign currency exchange rates.

Google other revenues

Google other revenues increased $1.0 billion from 2021 to 2022 primarily driven by growth in YouTube non-advertising and hardware revenues, partially offset by a decrease in Google Play revenues. The growth in YouTube non-advertising was largely due to an increase in paid subscribers. The growth in hardware was primarily driven by increased sales of Pixel devices. The decrease in Google Play revenues was primarily driven by the fee structure changes we announced in 2021 as well as a decrease in buyer spending. Additionally, the overall increase in Google other revenues was adversely affected by the unfavorable effect of foreign currency exchange rates.

Google Cloud

Google Cloud revenues increased $7.1 billion from 2021 to 2022. The growth was primarily driven by Google Cloud Platform followed by Google Workspace offerings. Google Cloud's infrastructure and platform services were the largest drivers of growth in Google Cloud Platform.

Revenues by Geography

The following table presents revenues by geography as a percentage of revenues, determined based on the addresses of our customers:

	Year Ended December 31,	
	2021	2022
United States	46 %	48 %
EMEA	31 %	29 %
APAC	18 %	16 %
Other Americas	5 %	6 %
Hedging gains (losses)	0 %	1 %

For further details on revenues by geography, see Note 2 of the Notes to Consolidated Financial Statements included in Item 8 of this Annual Report on Form 10-K.

Use of Non-GAAP Constant Currency Information

International revenues, which represent a significant portion of our revenues, are generally transacted in multiple currencies and therefore are affected by fluctuations in foreign currency exchange rates.

The effect of currency exchange rates on our business is an important factor in understanding period-to-period comparisons. We use non-GAAP constant currency revenues ("constant currency revenues") and non-GAAP percentage change in constant currency revenues ("percentage change in constant currency revenues") for financial and operational decision-making and as a means to evaluate period-to-period comparisons. We believe the presentation of results on a constant currency basis in addition to U.S. Generally Accepted Accounting Principles (GAAP) results helps improve the ability to understand our performance, because it excludes the effects of foreign currency volatility that are not indicative of our core operating results.

Constant currency information compares results between periods as if exchange rates had remained constant period over period. We define constant currency revenues as revenues excluding the effect of foreign exchange rate movements ("FX Effect") as well as hedging activities, which are recognized at the consolidated level. We use constant currency revenues to determine the constant currency revenue percentage change on a year-on-year basis. Constant currency revenues are calculated by translating current period revenues using prior year comparable period exchange rates, as well as excluding any hedging effects realized in the current period.

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 and hedging effects are excluded from revenues of both periods.

These results should be considered in addition to, not as a substitute for, results reported in accordance with GAAP. Results on a constant currency basis, as we present them, may not be comparable to similarly titled measures used by other companies and are not a measure of performance presented in accordance with GAAP.

The following table presents the foreign exchange effect on international revenues and total revenues (in millions, except percentages):

	Year Ended December 31,		Year Ended December 31, 2022					
					% Change from Prior Period			
	2021	2022	Less FX Effect	Constant Currency Revenues	As Reported	Less Hedging Effect	Less FX Effect	Constant Currency Revenues
United States	$ 117,854	$ 134,814	$ 0	$ 134,814	14 %		0 %	14 %
EMEA	79,107	82,062	(8,979)	91,041	4 %		(11)%	15 %
APAC	46,123	47,024	(3,915)	50,939	2 %		(8)%	10 %
Other Americas	14,404	16,976	(430)	17,406	18 %		(3)%	21 %
Revenues, excluding hedging effect	257,488	280,876	(13,324)	294,200	9 %		(5)%	14 %
Hedging gains (losses)	149	1,960						
Total revenues[(1)]	$ 257,637	$ 282,836		$ 294,200	10 %	1 %	(5)%	14 %

(1) Total constant currency revenues of $294.2 billion for 2022 increased $36.7 billion compared to $257.5 billion in revenues, excluding hedging effect for 2021.

EMEA revenue growth was unfavorably affected by changes in foreign currency exchange rates, primarily due to the U.S. dollar strengthening relative to the Euro and the British pound.

APAC revenue growth was unfavorably affected by changes in foreign currency exchange rates, primarily due to the U.S. dollar strengthening relative to the Japanese yen and the Australian dollar.

Other Americas growth was unfavorably affected by changes in foreign currency exchange rates, primarily due to the U.S. dollar strengthening relative to the Argentine peso.

Costs and Expenses

Cost of Revenues

The following table presents cost of revenues, including TAC (in millions, except percentages):

	Year Ended December 31,	
	2021	2022
TAC	$ 45,566	$ 48,955
Other cost of revenues	65,373	77,248
Total cost of revenues	$ 110,939	$ 126,203
Total cost of revenues as a percentage of revenues	43 %	45 %

Cost of revenues increased $15.3 billion from 2021 to 2022. The increase was due to an increase in other cost of revenues and TAC of $11.9 billion and $3.4 billion, respectively.

The increase in TAC from 2021 to 2022 was due to an increase in TAC paid to distribution partners and to Google Network partners, primarily driven by growth in revenues subject to TAC. The TAC rate was 22% in both 2021 and 2022. The TAC rate on Google Search & other revenues and the TAC rate on Google Network revenues were both substantially consistent from 2021 to 2022.

The increase in other cost of revenues from 2021 to 2022 was primarily due to increases in data center costs and other operations costs as well as hardware costs.

Research and Development

The following table presents R&D expenses (in millions, except percentages):

	Year Ended December 31, 2021	Year Ended December 31, 2022
Research and development expenses	$ 31,562	$ 39,500
Research and development expenses as a percentage of revenues	12 %	14 %

R&D expenses increased $7.9 billion from 2021 to 2022 primarily driven by an increase in compensation expenses of $5.4 billion, largely resulting from a 21% increase in average headcount, and an increase in third-party service fees of $704 million.

Sales and Marketing

The following table presents sales and marketing expenses (in millions, except percentages):

	Year Ended December 31, 2021	Year Ended December 31, 2022
Sales and marketing expenses	$ 22,912	$ 26,567
Sales and marketing expenses as a percentage of revenues	9 %	9 %

Sales and marketing expenses increased $3.7 billion from 2021 to 2022, primarily driven by an increase in compensation expenses of $1.8 billion, largely resulting from a 19% increase in average headcount, and an increase in advertising and promotional activities of $1.3 billion.

General and Administrative

The following table presents general and administrative expenses (in millions, except percentages):

	Year Ended December 31, 2021	Year Ended December 31, 2022
General and administrative expenses	$ 13,510	$ 15,724
General and administrative expenses as a percentage of revenues	5 %	6 %

General and administrative expenses increased $2.2 billion from 2021 to 2022. The increase was primarily driven by an increase in compensation expenses of $1.1 billion, largely resulting from a 21% increase in average headcount, and an increase in third-party services fees of $815 million. In addition, there was a $551 million increase to the allowance for credit losses for accounts receivable, as the prior year comparable period reflected a decline in the allowance.

Segment Profitability

The following table presents segment operating income (loss) (in millions).

	Year Ended December 31, 2021	Year Ended December 31, 2022
Operating income (loss):		
Google Services	$ 91,855	$ 86,572
Google Cloud	(3,099)	(2,968)
Other Bets	(5,281)	(6,083)
Corporate costs, unallocated[(1)]	(4,761)	(2,679)
Total income from operations	$ 78,714	$ 74,842

(1) Unallocated corporate costs primarily include corporate initiatives, corporate shared costs, such as finance and legal, including certain fines and settlements, as well as costs associated with certain shared R&D activities. Additionally, hedging gains (losses) related to revenue are included in corporate costs and totaled $149 million and $2.0 billion in 2021 and 2022, respectively.

Google Services

Google Services operating income decreased $5.3 billion from 2021 to 2022. The decrease in operating income was primarily driven by increases in compensation expenses and TAC, partially offset by growth in revenues.

Google Cloud

Google Cloud operating loss decreased $131 million from 2021 to 2022. The decrease in operating loss was primarily driven by growth in revenues, partially offset by an increase in compensation expenses.

Other Bets

Other Bets operating loss increased $802 million from 2021 to 2022. The increase in operating loss was primarily driven by increases in compensation expenses, partially offset by growth in revenues.

Other Income (Expense), Net

The following table presents other income (expense), net, (in millions):

	Year Ended December 31,	
	2021	2022
Other income (expense), net	$ 12,020	$ (3,514)

Other income (expense), net, decreased $15.5 billion from 2021 to 2022 primarily due to changes in gains and losses on equity securities and performance fees. In 2022, $3.2 billion of net unrealized losses were recognized on marketable equity securities and $1.5 billion of net realized losses were recognized on debt securities. These losses were partially offset by interest income of $2.2 billion and reversals of previously accrued performance fees related to certain investments of $798 million. In 2021, $9.8 billion of net unrealized gains were recognized on non-marketable equity securities and $1.5 billion of interest income was recognized, partially offset by $1.9 billion of accrued performance fees related to certain investments.

See Note 7 of the Notes to Consolidated Financial Statements included in Item 8 of this Annual Report on Form 10-K for further information.

Provision for Income Taxes

The following table presents provision for income taxes (in millions, except for effective tax rate):

	Year Ended December 31,	
	2021	2022
Income before provision for income taxes	$ 90,734	$ 71,328
Provision for income taxes	$ 14,701	$ 11,356
Effective tax rate	16.2 %	15.9 %

The effective tax rate decreased from 2021 to 2022, primarily driven by the effects of capitalization and amortization of R&D expenses in 2022 as required by the 2017 Tax Cuts and Jobs Act generating an increase in the U.S. federal Foreign Derived Intangible Income tax deduction. The decrease was partially offset by a decrease in pre-tax earnings, including in countries that have lower statutory rates and a decrease in the stock-based compensation related tax benefit. See Note 14 of the Notes to Consolidated Financial Statements included in Item 8 of this Annual Report on Form 10-K for further information.

Financial Condition

Cash, Cash Equivalents, and Marketable Securities

As of December 31, 2022, we had $113.8 billion in cash, cash equivalents, and short-term marketable securities. Cash equivalents and marketable securities are comprised of time deposits, money market funds, highly liquid government bonds, corporate debt securities, mortgage-backed and asset-backed securities, and marketable equity securities.

Sources, Uses of Cash, and Related Trends

Our principal sources of liquidity are cash, cash equivalents, and marketable securities, as well as the cash flow that we generate from operations. The primary use of capital continues to be to invest for the long-term growth of the business. We regularly evaluate our cash and capital structure, including the size, pace, and form of capital return to stockholders.

The following table presents our cash flows (in millions):

	Year Ended December 31,	
	2021	2022
Net cash provided by operating activities	$ 91,652	$ 91,495
Net cash used in investing activities	$ (35,523)	$ (20,298)
Net cash used in financing activities	$ (61,362)	$ (69,757)

Cash Provided by Operating Activities

Our largest source of cash provided by operations are advertising revenues generated by Google Search & other properties, Google Network properties, and YouTube properties. Additionally, we generate cash through sales of apps and in-app purchases, and hardware; and licensing and service fees, including fees received for Google Cloud offerings and subscription-based products.

Our primary uses of cash from operating activities include payments to distribution and Google Network partners, to employees for compensation, and to content providers. Other uses of cash from operating activities include payments to suppliers for hardware, to tax authorities for income taxes, and other general corporate expenditures.

Net cash provided by operating activities decreased from 2021 to 2022 primarily due to the net effect of an increase in cash received from revenues, offset by increases in cash paid for cost of revenues and operating expenses and an increase in tax payments driven by the effects of capitalization and amortization of R&D expenses beginning in 2022 as required by the 2017 Tax Cuts and Jobs Act.

Cash Used in Investing Activities

Cash provided by investing activities consists primarily of maturities and sales of investments in marketable and non-marketable securities. Cash used in investing activities consists primarily of purchases of marketable and non-marketable securities, purchases of property and equipment, and payments for acquisitions.

Net cash used in investing activities decreased from 2021 to 2022 as a result of a decrease in net purchases of and maturities and sales of marketable securities, partially offset by an increase in purchases of property and equipment.

Cash Used in Financing Activities

Cash provided by financing activities consists primarily of proceeds from issuance of debt and proceeds from the sale of interest in consolidated entities. Cash used in financing activities consists primarily of repurchases of stock, net payments related to stock-based award activities, and repayments of debt.

Net cash used in financing activities increased from 2021 to 2022 primarily due to an increase in repurchases of stock.

Liquidity and Material Cash Requirements

We expect existing cash, cash equivalents, short-term marketable securities, cash flows from operations and financing activities to continue to be sufficient to fund our operating activities and cash commitments for investing and financing activities for at least the next 12 months and thereafter for the foreseeable future.

Capital Expenditures and Leases

We make investments in land and buildings for data centers and offices and information technology assets through purchases of property and equipment and lease arrangements to provide capacity for the growth of our services and products.

Capital Expenditures

Our capital investments in property and equipment consist primarily of the following major categories:

- technical infrastructure, which consists of our investments in servers and network equipment for computing, storage, and networking requirements for ongoing business activities, including AI, (collectively referred to as our information technology assets) and data center land and building construction; and
- office facilities, ground-up development projects, and building improvements (also referred to as "fit-outs").

Construction in progress consists primarily of technical infrastructure and office facilities which have not yet been placed in service. The time frame from date of purchase to placement in service of these assets may extend from months to years. For example, our data center construction projects are generally multi-year projects with multiple