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THE LOCATION OF THE TECHGIANT (GOOGLE) " INTHEFIELDOF ARTIFICIAL INTELLIGENCE"

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Abstract:

The study aimed at establishing the position of Google in artificial intelligence by analyzing both the field of AI and Google. This is why it discovered that Google's website presents a wide concept of AI while stressing on new development in different fields of technology. Google AI is one of the way how this company demonstrates its cutting-edge work in the sphere of AI as a set of technologies that are meant to solve large scale global problems.

Their AI projects include areas such as machine learning, NLP and sentiment, CV and ethics of AI. Subsequently, Google shows its key AI models, PaLM and LaMDA to point out improvements in the way that language is understood and generated. The site also states that they are committed to safe and sane development of AI suggesting that they are out to build the strong, ethical AI. They rely on services such as Google Cloud AI.

Introduction:

It is worth mentioning that artificial intelligence is among the most influential factors that contribute to the level of advancement and economic development across the whole world, according to the shift towards the Fourth Industrial Revolution, particularly digitalization and AI application as well as incentives for creativity across different industries and the quality of lives..Based on that, it turned to the future strategies of a number of Arab countries directed on receiving a possibility to use applications artificial intelligence and technologies belonging to the Fourth Industrial Revolution.

In the conditions of the increasing rate of new technologies, Google as an actor of technology industry now plays the role of a leading actor for the development of artificial intelligence as this actor highlighted a qualitative shift in the approaches towards smart technologies that have transformed the notions of knowledge and technologies.The crucial issue is in how Google contributes to the formation of trend in development of AI and various technologies, their role in social and economic life.

Google is among the leading technology moguls in the world today and has served a decisive and an extraordinary role in the course of artificial intelligence.Since it was formed at the end of the 1990s, it has tried to establish new technological applications based on artificial intelligence and has spent copious and global amounts and capitals in this sphere.

Google has been able to advance qualitatively in most of the applications of artificial intelligence, even as a search engine, to more complex machine learning platforms like TensorFlow.The company has also created systems of artificial intelligence like the AlphaGo that defeated the Go heroes, simultaneous translation, image and voice recognition systems..

In recent years, Google has launched sophisticated language models like Bert, LaMDA and then bard, which are a new generation language model in the field of NLP combined with an intelligent interface

for users.Auto has also focused on higher risk-applied applications of AI that embraces healthcare, medical diagnosis, climate change and auto pilot age.

❖ **The problem of the study:**

In order to proceed with today, several generalized and specifically Google Foundation's beliefs and assumptions are as follows Especially the search for AI applications that is fill the missing link in business. Foundation in particular Especially the search for AI applications that form the missing link in the business world

First of all, it outlines a, on the one hand,–sustainable competitive advantage, if acquired, and the capability of creating it and applying it.

It would have been effective on the other hand. Therefore, we askthe following main question:

How is artificial intelligence implemented in Google in real?

In order to answer this problem, thefollowing sub-questions must be asked :

- What is artificial intelligence, and which components are most valuable?
- What is the Google Foundation and what components have been adopted by it in its support of artificial intelligence ?

❖ **Hypotheses of the study:**

- The current study assumes that Google has made several main axes: The first, to build very high platforms and tools such as tens flow and Bert, the second, and this is the most important axis, Google has invested heavily in research in the field of artificial intelligence as well as in the smart machine learning and deep learning;
- Another assumption in the study is that the firm has effectively incorporated all the AI technologies in its diverse products and services, which include search engine, cloud computing services and smart phone application.

❖ **Significance of the Study:**

The importance of the study is highlighted in:

- Recognizing that artificialintelligence is playing an important role in shaping institutional environment and can help to improveCompetitiveness of enterprises and its effect on their performance .
- Focusing on the specific approaches taken by Google in the area of artificial intelligence and how despite a lot of the ideas being theoretical, Google has achieved an ability to translate them practically.

❖ **Study Objectives:**

Thisstudy seeks to achieve the following objectives:

- The tutorial will explain the key areas and manifestations of artificial intelligence;
- Understanding that institutions are supported by artificial intelligence.Constructing a combined theoretical system, along with an account of continued and augmenting practices and concepts.IA needs to be developed in Google to give appropriate data and information;
- Provide suggestions towards the study outcomes.About the basic concepts related to artificialintelligence and its applications;
- Recognize the roleofartificialintelligence in supporting institutions;
- Developing an integrated theoretical framework, including an explanation of practices and ideas that maintain and contribute to Develop artificial intelligence in Google to provideappropriate data and information for future researchers;
- Make recommendations in lightof the results of the study;

- This research will seek to compare and evaluate Google's innovation trajectories in AI, as well as evaluate the company's capabilities in the production of sophisticated AI technologies including, machine, deep learning, and generative AI.

❖ **Methodology:**

Regarding the topic of the research and following the mentioned problematic, the descriptive research approach was only employed, based on the mapping of Google's evolution in the AI field. Most of the information was collected from multiple sources such as technical papers, scientific articles, as well as statements created by the company itself.

I. Artificial Intelligence (AI) idea

From the following table, let us identify set of concept about artificial intelligence
Some steady definitions involving artificial intelligence from outside of the table are:

Table 01: Definitions of Artificial Intelligence (AI)

Definition	Source
Definition by John McCarthy: "Artificial intelligence is the use of computing technique in order to create intelligent systems or smart machines, it also refers to a broad field of computer science.	(McCarthy, 2007)
Definition by Elaine Rich: "Artificial Intelligence is the science of making things intelligent enough, in order to do what they have not the capacity to perform today better than humans.	(Rada, 1983)
Definition by Stuart Russell and Peter Norvig: "Artificial Intelligence could be understood as the branch of knowledge that concern agents obtaining input from their environment and acting."	(Russell & Norvig, 2020)
Definition by Marvin Minsky: "AI is defined as the making of computers or other machines capable of performing tasks that otherwise require human intelligence if done"	(Minsky, 1968)
Definition by IBM: "Artificial intelligence can be defined as systems or machines that, in a behavioural manner, resemble human intelligence for one or all of the functions that it possesses, and can adapt by themselves using data procured by it"	(IBM, 2024)
Definition from Stuart Russell and Peter Norvig (2010): In artificial intelligence, therefore, it is considered as "the study of agents that receive percepts from the environment and perform actions"	(Russell & Norvig, 2010)
Definition by the European Commission (2018): "Artificial intelligence simply means an electrical computer system that copies intelligent behavior by learning its	(European Commission, 2018)

surroundings and functions independently to achieve planned aims"	
Definition from the Merriam-Webster Dictionary: Artificial intelligence is "the power of a machine to mimic intelligent human action".	(Merriam-Webster, (n.d.))
Definition by the Association for the Advancement of Artificial Intelligence (AAAI): Artificial intelligence is "the scientific undertaking of the processes in which a thing is thought and rational conduct and the reduction of these into rational procedures that may be mimicked by machines".	(AAAI, 2021)

Source: Prepared by researchers based on the sources mentioned above

1.Characteristics of Artificial Intelligence:

This paper defines AI based on several unique attributes that govern its operations and raison d'être. These include (Russell & Norvig, 2020):

1.1. Machine Learning: AI systems carry out the processes of pattern recognition and enhancement of their execution from one occurrence to another mediated by algorithms but are not explicitly programmed.

1.2. Natural Language Processing (NLP): In synthesis, AI is the ability of a machine or a computer to comprehend and answer to any language used by humans.

1.3. Problem-Solving: AIcan systematically approach a problem, recognize relationships between the given objects, and offer a solution in a short time.

1.4. Reasoning: It is possible to make an output look like a logical series of conclusions by using an AI system capable of mimicking such a functioning in certain domains.

1.5. Automation: AI also reduces costs through elimination of repetition and putting of repetitive work and processes into line programs.

1.6. Adaptability: Unlike traditional programs that operate in a fixed way, AI systems learn new data, environments, and contexts and revisit aspects of their learnt behavior when exposed to more of it.

1.7. Perception:AI can understand and analyse visual, auditory, haptic, or other types of signals to interact with the surroundings.

2. The Historical Development of Artificial Intelligence:

Artificial intelligence AI, is a concept that emerged in the mid twentieth century as a branch of science that aimed at developing machine that would possess human qualities of intelligence.In actuality, the general term of 'artificial intelligence' was created by John McCarthy, in the year 1956 at Dartmouth conference that has been recognized as the founding father of artificial intelligence.This conference gathered individuals to discuss if It was possible to teach computers to work like brains, solve problems and learn.(McCarthy, Minsky, Rochester, & Shannon, 2006).

Table 02: The Historical Development of Artificial Intelligence

The Beginnings of Artificial Intelligence 1950	– Acadicians are started defining artificial intelligence.- This term was coined in 1956 by John McCarthy while in America at Dartmouth Collegeence; – The term "artificial intelligence" was coined by John McCarthy in 1956.
Initial Progress 1960	– Develop the first smart software such as ELIZA; – Initiate research into the field of vision of the machine and robots.

1970 recession	– Slow progress due to technical challenges; – Reduce funding for AI research.
Al Nahda	– Development of expert systems and programmed logic; – The use of artificial intelligence in commercial applications.
Machine Learning	– Development of advanced machine learning technologies; – Application of artificial intelligence in areas such as finance. And Medicine
Rapid Evolution 2000	– Development of artificial neural networks; – The use of AI in areas such as voice and image recognition.
Deep Learning Approach2010 2010	– Development of deep learning and advanced neural networks; – The use of artificial intelligence in self-driving cars and voice search.
Advanced artificial intelligence 2020	– Development of advanced AI technologies such as enhanced learning; – The use of AI in areas such as health and education.

Source: Prepared by researchers based on(John, Marvin, Nathaniel, Herbert, & Simon, 2021)

3. Areas of Artificial Intelligence

AI comprises many fields each focused in distinct facets of intelligent systems. Some key areas include (Russell & Norvig, 2020):

3.1. Machine Learning (ML): Is preoccupied with methods that facilitate automating a system and enabling it to progress through data without requiring programming.

3.2. Natural Language Processing (NLP): Pertains to computer processing of human language, for example, tools required to translate languages, to determine the perception of texts, etc.

.3.3.Computer Vision: This type of, involves making machines capable of understanding visual data in the world including objects recognition or face detection among others.

3.4. Robotics: Covers the merger between artificial intelligence and engineering to build prototypes that can work either fully or partly on their own.

3.5. Expert Systems: Deploys knowledge-based point to mimic the power of decision making possessed by the human authorities within certain subject areas.

3.6. Reinforcement Learning: Takes an approach of teaching models to make a sequence of choices on a particular procedure to deliver a preferred 3290ehavior.

II. Google:

Google LLC is one of the most significant IT enterprises globally, focused on Internet-service and related products.Google was originally created as the search engine by Larry Page and Sergey Brin, students at Stanford University in 1998 and then transformed into the multinational

technology company.Currently, Google is a company owned by Alphabet Inc., formed when the company went through a reorganization in 2015.Google isn't just search engines but also has advertising, cloud computing, hardware, and software as its service offerings.

1. **History**

   Google originated as research project by Larry Page and Sergey Brin in 1996 while the two were still at Stanford University.The concept was to increase the effectiveness of the ranking mechanisms of websites utilizing the quantitative parameter of so called 'back links', or, the number of links that referred to the existing website.It was really its Page Rank when its competitors lacked any such idea.Google.com was registered as domain name in September 1997 and the company Google was incorporated in September 1998 (Investopedia, 2023).

2. **Google's Initial Funding**

   Google got its first capital in its account in August 1998, Andy Bechtolsheim who is a co-founder of Sun Microsystems put $100, 000 in Google account to help the company to rent its first office in Menlo Park California.(statcounter, 2023). By 1999 Google was able to obtain more Venture Capital from Sequoia Capital and Kleiner Perkins, which helped the company to grow.

3. **Corporate Structure:**

   However, in 2015 a significant corporate restructuring occurred, Google Inc. was reshaped into Alphabet Inc (theverge , 2024). This restructuring helped free Google to concentrate on its markets and products while Alphabet could look after activities such as Waymo, Verily and Deep Mind.

4. **Financial Performance**

   Currently, Alphabet Inc., has shareholders' annual revenue of more than $282 billion, putting it among the world's richest firms(investor, 2024). Google Advertisements and YouTube specifically are, to this date, Google's biggest source of money and thus its key to success.

5. **Challenges and Controversies**

   5.1. Antitrust Issues

   Google has been involved in sever antitrust cases especially in regard to Google search services and digital advertising.In December last year, the U.S. Department of Justice brought an antitrust complaint against Google with accusations that it entered into and maintained monopolies by stifling competition (washingtonpost , 2024). Others have been brought in the European Union where Google has been fined billions of Euros of being in anti-competitive practices (BBC, 2024).

   5.2. Privacy and Data Collection Concerns

   People are gradually becoming worried about how Google acquires, processes, and capitalizes on users' information.These consist of for example,; In 2018 the EU introduced stricter privacy laws through the General Data Protection Regulation which prompted fines and legal action against Google's data collection. (cnbc, 2024)

6. **Key Products and Services**

   6.1 Search Engine

   Google Search, better known as Google.com, is the company's most widely recognized product.By 2023, it has a market share of more than 90% of all the internet search conducted across the world(statcounter, 2023). Google search engine became successful since the day it started undergoing changes, combined with the incorporation of artificial intelligence and machine learning for better and more relevant results.

   6.2 Google Ads

Google Ads, formerly known as Google AdWords, remains the largest source of the company's income.The website was created in 2000 and it enables the firms to market their products and services by using paid placement; this is carried out through sponsored Link and through advertising.(statista, 2024). Google Ads alone accounts for more than half of Alphabet's revenues and, in 2022, it recorded more than $224 billion in sales(Alphabet, 2024).

6.3 Android OS

Android Inc. was owned by Google and was bought by it in 2005 which marked Google's initial steps towards this market classification of operating system.Currently, Android OS has become the leading OS throughout the world in terms of market share since it is used in more than 72% of the mobile gadgets available in the market today(statista, 2024).

6.4 Google Cloud AI Platform

Currently providing cloud computing services, Google Cloud was started in 2008 and offers storage, analysis, and machine learning.It steadily grows a market share lagging behind such giants as AWS and Microsoft Azure, but in 2022 Google Cloud was able to generate $26.28 billion in revenue(businessinsider, 2024).

6.5 YouTube

YouTube was purchased by Google in October 2006 for $1.65 billion (the new work times, 2024). Currently, YouTube is the market leader of the online video-sharing platforms having an Average Monthly Active Beneath 2.5 billion are users (statista, 2024). YouTube ads also have played a significant role in shaping the revenues of Google, and included a large part of its revenues equation.

III. Strategic Analysis of Google Inc:

Google LLC, which is wholly owned by Alphabet Inc., is a technology behemoth company that was started in 1998.Google could boast important competitive advantage due to the policy of constant development and improvement, acquisitions, and diversification of services.This writing will also analyze the company SWOT, the company's competitive strategy, and how the Alphabet firm's structure assists its growth chances.

Analysis

1. Strengths

1.1. Market Dominance in Search Engine: Google is currently a market leader that controls more than 90% of the total search engine market(statcounter, 2023). Having such a big market share is useful in a way that it gives the company more data about the users, more ad revenues, and better recognition among the public.

1.2. Strong Brand Value: Google has earned its place many times among the ten most valuable brands in the world.Interbrand states that Google was fourth in brand value in 2022, with brand value of about $257 billion.(interbrand, 2024).

1.3. Diverse Product Portfolio: Google's offerings include its search engine, Google ads, YouTube, Google cloud and Android.This expansion also lets Google minimize various risks tied with the over dependence on one product or service provided.

1.4. Innovation and R&D: Google is highly involved in researching and developing new technologies, which have cost them more than $31 billion this year, 2022.(support.google, 2024). It enables Google to remain a cutting-edge company and shape its evolution in such industry segments as artificial intelligence (AI) and quantum computing or cloud service.

2. Weaknesses

2.1. Overdependence on Advertising Revenue: More than 80% of the company's income originates from advertising(blog.google, 2024)This makes the company to be at the mercy of the going market trends in advertising, while dependency on a single product line makes the company to reply on the economic trends.

2.2. Privacy Concerns: The matter of privacy in connexion with the collect and use of personal data by Google has attracted controversy.Penalties and fines and in general legal proceedings

especially under GDPR regulation in EU areas have impacted the company's reputation.(cloud.google., 2024).

2.3. Limited Social Media Presence: Oddly, Google tried to muscle in on the social media arena several times owning YouTube, but it failed big time with social media products like Google(tensorflow, 2024). This leaves Google with little strong position in one of the fastest growing digital advertising categories.

3. Opportunities

3.1. Cloud Computing Growth: Global cloud computing is anticipated to be valued at $832 billion in the near future by 2025.Google Cloud despite being small as compared to AWS and Microsoft Azure is expanding fast enough and it will be a key driver of Google's future revenues (BBC, 2024).

3.2. Expansion in AI and Machine Learning: Artificial Intelligence and Machine learning are the technological facets that are quickly becoming the focal point of all future technology advancement.Google's investments into AI have positioned the company through DeepMind to dominate sectors such as healthcare, automobiles and predictive analytics(nature, 2024).

3.3. Smart Home and IoT Market: Google through its acquisition of Nest Labs in 2014 and it smart home products such as Google Home and Google Assistant puts the firm strategically in the growing IoT market.(theguardian, 2024).

4. Threats

4.1. Antitrust Regulations: Different governments across the globe are investigating Google for monopolistic conducts in Internet advertising and web search services.There are two current active anti-trust investigations which can lead to fines, or force a modification, of Google's business practices: the U.S. Department of Justice, and the European Union.(deepmind, 2024)

4.2. Competition from Other Tech Giants: Once again, such giants as Amazon, Microsoft, and Facebook try to compete with Google taking the same positions in some segments, such as cloud services, digital advertising, video hosting services.This put pressure on the Google to develop new products and services so as to counteract the menace posed by other search engine firms..

4.3. **Cybersecurity Threats:**Being one of the largest technology companies in the world Google is a high-risk company since it is always under the threat of hackers.Ses breaches in data security or user privacy is followed by penalties, litigation and lost reputation.

IV. Google's Competitive Strategy in the Field of Artificial Intelligence

1. **AI is one of Google's areas of specialization** and it has continued to stay ahead of its competitors by employing the perfect cocktail of technology, skills and a highly creative team of professionals.The following areas are part of the company's AI future plan: a focus on research and development, acquisitions, open-source projects, and, of course, the implementation of AI in the products and services offered by the company. Below is a detailed analysis of Google's competitive strategy in AI:
2. **Heavy Investment in Research and Development (R&D):** Google has been very active in their investment when it comes to AI.Google Research , previously referred to as Google AI, is the search giant's research division and is devoted to improving on artificial intelligence in various facets such as NLP, CV and deep learning.Google's researchers release research papers at premier AI conferences, which in return makes the firm a noteworthy leader in the league of AI advancement..

1. **Example:**Example: Nowadays, Google creates references such as Bert (Bidirectional Encoder Representations from Transformers), which enhanced understanding of search queries as well as NLP tools (Devlin, Ming-Wei, Kenton, & Kristina, 2019).

3. **Strategic Acquisitions:** Google has taken over several companies that deal with artificial intelligence to reinforce its capacities and to find more talents.These acquisitions not only include new technologies to the company, but also bring in the best artificial intelligence brains into the firm.

• **Example:**The opinion of the author is that the purchase of Deep Mind in the same year signified a revolutionary period in AI advancement.It has since been able to make historic progress where it beat games such as Go and Star Craft II, and has made massive progress in healthcare AI agents.(Silver, Huang, Maddison, Guez, Sifre, & George, 2018)

4. **Open-Source Contributions:** Google has relaxed the trend by opening up its resources for collaboration as a way of creating the company as a major player in the development of AI.Therefore, by providing the use of open-source tools and frameworks developers around the globe use, Google guarantees its place in this emerging network
   - **Example:**Since the publication of the TensorFlow: A Machine Learning Framework in 2015, TensorFlow has become the standard technological platform for AI research and AI application development(Abad, et al., 2016). By developers' worldwide usage of TensorFlow, Google extends the company's ecosystem.
5. **Integration of AI Across Products and Services:** Most of the AI technologies have been effectively incorporated in Google's basic applications to bring about an efficient performance.AI is at the center of Google, and is used by many Google products including Search, Translate, YouTube, Photos, and Google's hardware including Pixel phones.
   • **Example:**The following is an application of Google Assistant which presents Google in a good standing in the market of AI virtual assistants based on voice recognition, NLP and service provision.
6. **Ethics and AI Governance:** To avoid problems of misuse of the technology, Google has set up rules for ethical use of artificial intelligence.In 2018, the company released guidelines that it would not incorporate the AI for immoral uses such as in the development of weapons systems that are autonomous.This commitment help to strengthen the image of Google and to get confidence for users as well as the regulators.(Pichai, 2018).
7. **Advancing AI for Social Good:** Google is applying AI for the general good and this inclu…And such initiatives do not only help the company to diversify the purview of its AI applications but also improves its brand identity..

   Example: Among these effects are flood prediction system, which are developed by Google's AI for Social Good program to help the affected communities with early information.
8. **Cloud AI Services:** Today, Google Cloud brought AI solutions and APIs for businesses with the aim to implement AI without any inside experience.This places the search engine giant in a B2B AI category where it has to strive amongst such compatriots as AWS and Microsoft Azure.

   .Example:Such option as Google Cloud AutoML enable organizations to train unique AI solutions without a great amount of technical background thereby increasing the scope of Google's clients in the AI sphere.

V. The Transformative Impact of Artificial Intelligence on Google's Business Ecosystem

Revenue Growth and AI Integration

Table 03: AI-Driven Revenue Impact

Year	Total Revenue	AI-Related Revenue	Percentage Increase
2016	$90.3 billion	$12.7 billion	14.1%
2019	$161.8 billion	$41.2 billion	25.5%
2022	$282.8 billion	$86.3 billion	30.6%

Source:(Alphabet Inc. Annual Financial Reports , 2022)

1. Key AI-Driven Business Transformations

a) Advertising Optimization

Machine learning algorithms improved ad targeting

40% increase in click-through rates

Estimated additional revenue of $15.2 billion in 2022
b) Cloud Services Expansion
Google Cloud AI services grew by 45% annually
Introduction of AI-powered tools:
Cloud AI Platform
AutoML
Vertex AI
Strategic AI Investments

Table04: Google's AI Research and Development Investments

Area of Investment	2018	2021	Economies in transition
Research	5b.	7b	148
Talent Acquisition Policy	2b.	4b.	183
Infrastructure	(8b)	5b.	132

Source:(Schmidt, 2022)

2. Financial results

Table 04: presents revenues by type (in millions)

	2020	2021
Google Search & other	$ 104,062	$ 148,951
YouTube ads	19,772	28,845
Google Network	23,090	31,701
Google advertising	146,924	209,497
Google other	21,711	28,032
Google Services total	168,635	237,529
Google Cloud	13,059	19,206
Other Bets	657	753
Hedging gains (losses)	176	149
Total revenues	$ 182,527	$ 257,637

Source:(Alphabet Inc. Annual Financial Reports , 2022)

3. Google Services

3.1. Google Search & other

Google Search & other revenues rose to 182.5 billion in 2021, from 137.6 billion in 2020.The overall growth was due to number of factors such as, there were growths in the search queries submitted owing to growths in users and usage, mainly, increased usage by consumers of mobile devices, increased advertiser dollars, and enhancements we have put in place regarding the formats of our advertisements and their delivery.The revenues that decreased by year such as the COVID-19 adverse effect on their 2020 revenues was also behind the year growth.

3.2. YouTube

The global YouTube advertising revenues rose $9.1 billion between 2020 and 2021.Growth was experienced in our narrator direct response and brand advertising offers.Most of the revenue growth for our direct response advertising products stemmed from higher advertising dollars spent with us, and enhancements made to both the formats and delivery systems.The growth in our brand advertising

products was mainly due to additional spending by our advertisers and the COVID 19 impact on 2020 promoting revenue.

3.3. Google Network

Google Network's revenues were $8,615 million higher in 2021 than in prior 2020.This growth was largely attributed to the growth of AdMob, Google Ad Manager, as well as AdSense.The decline in the 2020 revenues due to COVID-19 is also evidence by the fact that The year-over-year increase was also impacted by the negative effect that COVID-19 had on .

4. Segment Profitability

Table 04: segment operating income (loss) (in millions).

	2020	2021
Operating income (loss):		
Google Services	$ 54,606	$ 91,855
Google Cloud	(5,607)	(3,099)
Other Bets	(4,476)	(5,281)
Corporate costs, unallocated[1]	(3,299)	(4,761)
Total income from operations	$ 41,224	$ 78,714

Source:(Alphabet Inc. Annual Financial Reports , 2022)

4.1. Google Services

Google service's operating income rose by $37.2 billion between 2020 and 2021.This rise was realized through growth in revenues partially funded by rises in TAC, cost of content acquisition, operating labor cost in compensation, expenses on advertising and promotions, and some legal cases.Therefore, expenses rose partly in relation to lower costs due to revisions in the estimated remaining useful life of servers and some networks' equipment.The growth of operating income Y-o-Y also included the impact of COVID-19 on 2020 results.

4.2. Google Cloud

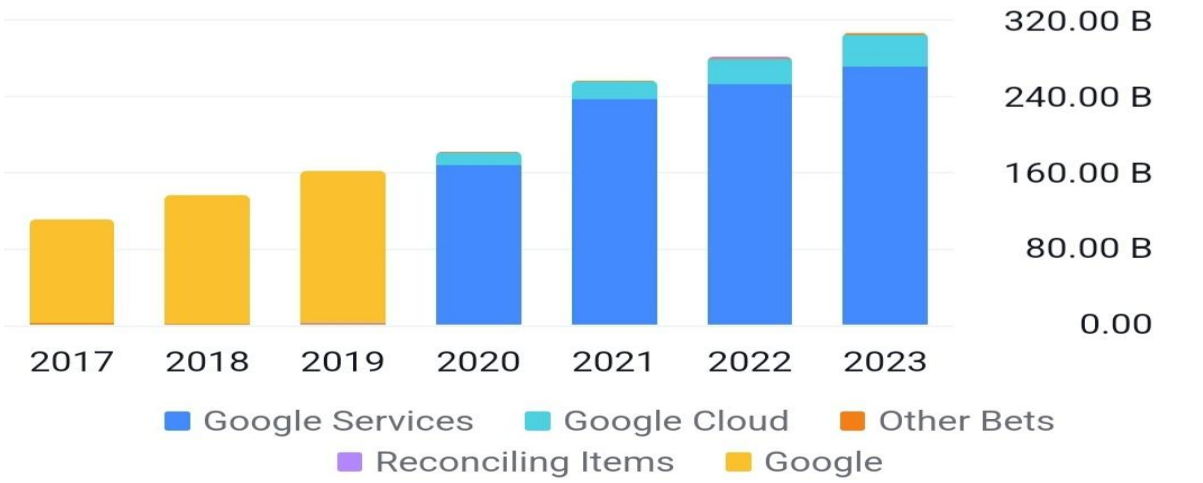
While Google Cloud continues to bring revenue the company recorded an operating loss of $2.5 billion, which previously was at $2.2 billion in 2020, but fell in 2021.The improvement in operating loss condition is due to the increase in revenues, other than that, an increase in expenses particularly compensation expenses has also been observed.The increase in expenses was partly offset by the decrease in costs resulting from the change in estimated useful life of our servers and certain network equipments.

4.3. Other Bets

Other Bets' operating loss escalated to $805 million in the period ended 31 December 2021 compared to the corresponding period in the prior year.The operating loss for the three and nine months ended September 30, 2021, also rose by $18m and $37m, respectively mostly due to compensation expenses, particularly the increase in valuation based compensation charges during the second quarter of the year.

5. Revenue Distribution Overview

Figure01 : Alphabet Inc Service Revenue Growth



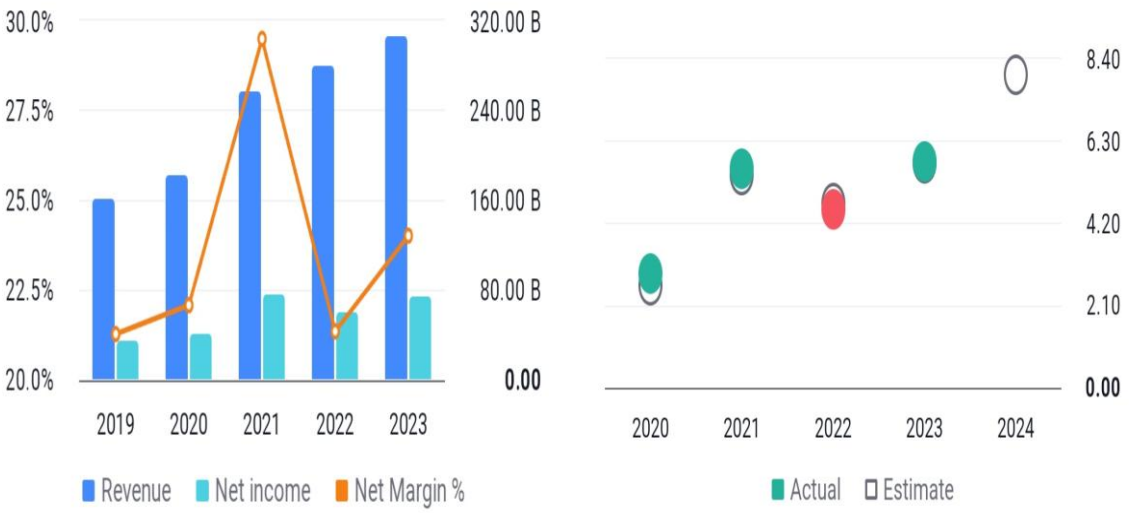
Source:

Prepared by researchers based on (tradingview, 2024)

From the above figure we can observe that all the revenues of different services have gradually escalated.Alphabet Inc. (Google) Class C generated $307.39 billion in revenue last year and $272.54 billion of it was from Google Services, the largest segment in terms of sales revenue this year, and the year before that figure was $253.53 billion.The most money was made in the USA — last year Alphabet Inc (Google) Class C generated $146,290 million of revenue, and the year prior — $134,810 million.

6. Growth in revenues of Alphabet Inc. during the period between 2019 and 2023

Figure:Alphabet Inc's revenues during the period between 2019 and 2023



Source : Prepared by researchers based on(tradingview, 2024)

From the above figure, we see that Alphabet has still been able to maintain steady growth within the years 2019-2023.This through a number of expansion updates.By incorporating the use of artificial intelligence AI in its business operations, inclusive of, better Gemini chatbot software, and more refined

search engine.Its parent company Alphabet also recorded revenue growth primarily due to a 35% increase in Google's artificial intelligence-based cloud business and higher growth in digital advertising.Alphabet's shares which shut 1.8 percent higher were up 4.4 percent in post closingtrade.rowth during the period between 2019 and 2023.This is due to a number of expansion updates.By resorting to the use of artificial intelligence AI in its business, including enhanced Gemini chatbot software and improvements to its precious search engine. Alphabet, Google's parent company, also won revenue boosted by a 35% rise in its AI-powered cloud computing business and a jump in digital advertising revenue. Shares of Alphabet, which closed 1.8 percent higher, rose 4.4 percent in post-closing trading. That is because the stock has been up around 22 percent this year, largely in tandem with other markets.Sales in Google's cloud business increase 35 percent to $11.35 billion in the third quarter from $8.39 billion a year earlier and above expectations of $10.86 billion.This is the highest quarterly growth rate since the three quarters to the current period and the above described capitalism in 2025 is still anticipated to be higher than the current year.

- Google has deepened and established a versatile strategic rivalry in artificial intelligence (AI) through innovation, emphatic research and pristine implementation across various fields.

1. Key Strategic Approaches:

1.1. Research and Development

Explorational funding through Google AI and Deep Mind Uninterrupted establishment of new generations of sophisticated machine learning algorithms Consistent introduction of new types of technologies including the transformer models(Brown, Benjamin, Ryder, Subbiah, & Kaplan, 2020)

1.2. Technological Integration

AI integration with Products AI development in Search, Cloud and Productivity tools Enabling Intelligent Platform through Google Assistant & Google Cloud(McAfee & Brynjolfsson, 2017)

1.3. Talent Acquisition and Collaboration

Recruiting the best talent in the field of AI Researching collaborations with Universities Furthering the adoption of Open Source tools in artificial intelligence**.**

1.4. Ethical AI Development

Applying accountable AI standards Prioritizing its adversative elements in AI technologies Creating AI solutions based on social purposes(Russell & Norvig, 2016)

1.5. Strategic Competitive Positioning

Direct competition with such market players as Microsoft and Open AI Utilizing vast datasets on an ongoing basis Ongoing development of generative AI and large language models

Conclusion:

Google proved to be able to make an amazing quantum leap in the field of artificial intelligence, continue its development through setting remarkable goals and introducing numerous inventions.Over the years AI has been incorporated into the numerous products and services of the company from its famous search engine, smart translation platforms to its digital assistant.One of Google's strategic focuses includes leveraging deep learning models and Language and Image recognition capabilities; skills that help Google to design unique solutions in the areas of health, education and transport amongst others.While having numerous ethical and technical implications for their creation, Google does not limit the usage of AI and makes every effort to ensure their respective safe use and non-violation of users 'rights to privacy and data protection.Google's future plans also engage a more effective and deeper integration of AI into our lives, predicting a shift in technological paradigm deeply modifying our conventional way of interacting with technology and allowing free creativity and explorative thinking.

Findings

The study reached a number of results, which we list in the following points:

1. And that Google is not only a technology company but an organism coordinating and improving

productivity and performance in the spheres of healthcare, education, industry, and entertainment.
2. The four biggest technology companies with artificial intelligence advanced technologies, they have accomplished unprecedented work and changed the dynamics of smart technologies.
3. They have achieved their aims in creating an elaborate network of intelligent ideas and programs that have revolutionized learning, working and effective communication paradigms like its ChatGPT Bard system, real-time simultaneous interpreting and voice and image detection technologies.
4. Analyzing the expenditures data it has been determined that Google spends over billions in AI annual, testifying its strategic focus on technology.**Recommendations:**
1. The requirement for further maintenance of investment in this field of Artificial Intelligence and their focus on ethical and humanistic equations and the usage of these technologies for the welfare of humanity and the achievement of the sustainable development goal.
2. Expand the shift towards a higher level of transparency on the use of such technologies in a way that will safeguard people's privacy and security, and the required innovations for the delivery of public good and minimising the risks of negative impacts by AI.
3. The increased awareness of the necessity to improve partnership between the international business and academic entities with the purpose of reaching higher performance of innovations, which effectively support the global community with solutions to sophisticated issues.

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