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Alphabet: Innovation Analysis

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Abstract: The pervasive growth of society has led to an increasing reliance on the Internet in people's daily lives. Among the integral components of the Internet, search engines play a pivotal role in enhancing usage efficiency. In this field, Alphabet is the industry leader among them. Therefore, this study focuses on analyzing Alphabet's business innovation pattern using a SWOT analysis. This research makes the case that Alphabet now benefits from a high product penetration rate for Google. Google's product advertising, on the other hand, is highly beneficial and helps to form a business model that combines products and advertisements. However, Alphabet faces a challenge wherein its customer base often confuses Google as a company rather than a product. The results of SWOT analyses showed that Alphabet has fresh prospects in the AI space. Alphabet's prospects are demonstrated by the introduction of self-driving technology under the Waymo brand, which combines a deep learning framework with additional AI technologies. Despite these opportunities, Alphabet is exposed to three major risks. Among these, the most substantial concern is the exorbitant cost associated with conducting subpar AI research. Furthermore, while Google entered the cloud computing arena later and with a smaller stake, heightened scrutiny from competitors intensified the rivalry in this field. Crucially, Google's handling of personal private data has come under scrutiny, potentially tarnishing the company's reputation and triggering a series of adverse events. The study presented in this paper can offer some suggestions for business strategies for rapidly emerging domestic information enterprises.

Keywords: Search engine, advertisement, cloud computing, innovation, AI

1. Introduction

Both the Internet economy and the number of people utilizing the Internet worldwide are growing in the present economic and social environment. IWS-World Internet Statistics estimates that 54.2 percent of all Internet users worldwide will be in the Asian area in 2023, making it the largest region globally. With a growth rate of 13,233%, the Internet population in the African area has had the biggest increase between 2000 and 2023. Also, there is no denying that Internet usage is spreading around the world. China's Internet penetration rate reached 76.4% as of June 2023, according to a study published by the China Internet Network Information Centre (CNNIC). This has continuously encouraged international Internet finance and associated firms to carry out ongoing modifications of their business models [1]. The increasing integration of the Internet into people's everyday lives has led to an inevitable rise in cybersecurity concerns, particularly about the exposure of personal data.

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In the era of digital intelligence, businesses can assist the production and research and development system by integrating data resources and utilising Internet technology for reconstruction and upgrading. This will allow for the reconstruction of models, synergistic symbiosis, cost savings, and efficiency improvements [2]. Google declared an asset restructure in August 2015. With this change, Google's core search and advertising businesses were set off from other, more recent ventures like cloud computing and artificial intelligence. Following the reorganisation, Google became a part of the newly established Alphabet, an American technology company that develops and offers a wide range of Internet-based products and services, with advertising services providing the majority of the company's revenue. Alphabet operates in the Internet, advertising, cloud computing, and other related fields. Furthermore, Alphabet offers a wide range of other Internet-based products and apps, so its marketing approach is not restricted to any one demographic or geographic area.

This study aims to provide researchers with a comprehensive perspective and contribute to the expansion of behavioral economics research in the context of internet corporations engaged in structural restructuring. Specifically, the research delves into the motivations that led to Google's establishment of Alphabet in 2015, along with an in-depth analysis of Alphabet's core businesses. In addition, this study examines the SWOT for the alphabet, which will assist local businesses in coming up with novel concepts for business models. Second, this study examines the business risks and model innovation that Alphabet faced, as well as the economic factors and business motivations that led to Google forming Alphabet. These factors not only support the company's corporate focus on model innovation, dynamic driven development, and the development of innovative thinking among employees but also the nation's ability to better grasp the direction and strength in creating a good atmosphere of cooperation between the government and enterprises. Furthermore, the study's incident involving the disclosure of patients' personal information online will force the Internet industry to enhance privacy collection standards, privacy protection guidelines, and consent for privacy use during development. These developments may, in part, compel businesses to better safeguard the privacy of Internet users.

2. Current Status of Intelligent Application (AI) Research at Domestic and Abroad

2.1. Domestic Research

Baidu's mobile ecological "reconstruction" continues to deepen, in addition to the launch of a series of AI native applications, Baidu alliance, and other business ecological reconstruction [3]. The Baidu Alliance undergoes extensive reconstruction, integrating ToB and ToC business models, and operational capabilities, and collaborating with native application developers and other partners for ecological co-construction[3]. This enhances overall efficiency from model conceptualization to product development and facilitates business boundary expansion. In September this year, the initial partner quota was swiftly filled, indicating that future plug-ins will have a low entry barrier, offering an excellent opportunity to leverage the model dividends. Empowering production and distribution through the three core competencies of commercial symbiosis significantly reduces developers' costs. This, in turn, enables Baidu to generate more revenue for developers. At present, the domestic market of three-dimensional generation is mainly from the Ali Cloud, Huawei Cloud, and other veteran technology vendors, but also from Taiji Graphics, Shanghai Jiao Tong University, City University of Hong Kong, and other entrepreneurial teams and R & D institutions [4]. The former applications are based on industry application scenarios and industry solutions, while the latter tends to promote the development of 3D generation applications from the technical level [5].

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2.2. Overseas Research

Currently, 3D generation tools in the overseas market come partly from tech giants such as NVIDIA and Meta, and partly from startups such as OpenAI, Luma, Kaedim, and Meshy. Meanwhile, generative language models such as OpenAI's ChatGPT, Google Bard, Microsoft Bing Chat, etc. have revolutionised the way doctors, researchers and the public interact with the knowledge base available on the internet in just a few months. Generative language modeling offers promise in patient education, medical education, medical office management, research, and clinical care [6]. Similarly, Google, the world's largest search engine, provides data on the frequency of searches through its "Google Trends" tool. Google Trends allows researchers to measure information seeking and consumer search behaviour [7], and this data source has been used to study responses to a range of national public health policies. For example, Tieks et al. [8] used Google Trends data to examine smoking-related outcomes following national smoking cessation programs (Stoptober) in England and the Netherlands [9].

3. Google's Key Businesses

3.1. Search Engine

Google's browser and search engine are also among its most competitive products. The usage rate of Google's browser has been steadily increasing over the past ten years, and the market share has been dominating the market for a long time. At the same time, by using Google's browser as the default browser, Google can continuously accumulate the browsing behaviour of users, which further enhances the efficiency and accuracy of Google's content push. Not only that, combined with the use of Google Chrome and search engine, Google search continues to form positive feedback closed loop, so that Google's business model is more and more mature and stable. As shown in Figure 1, in terms of global search engine share, Google reached 92.07%, far ahead of other search engines in the world, occupying a dominant position. The second largest search engine is Microsoft's Bing, with a market share of only 2.99%, a huge gap [10].

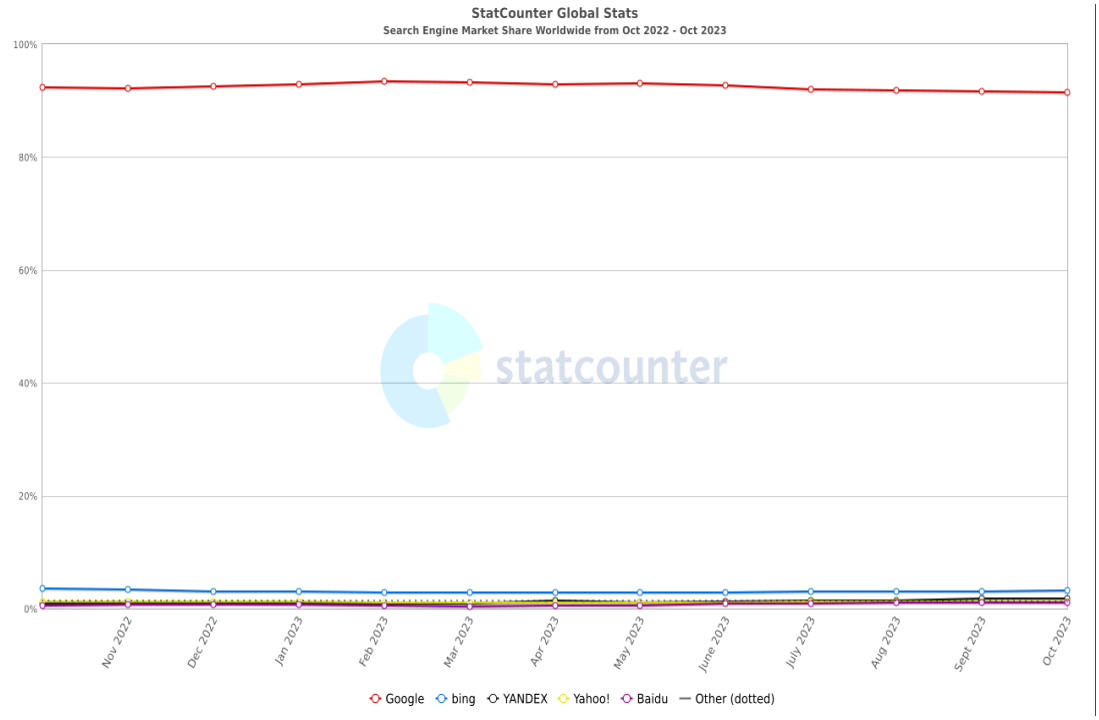

Figure 1: Global Search Engine Market Share, June 2009-2023 [11]

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3.2. Cloud Computing Business

After 2015, Google made large-scale adjustments to its business layout and continued to introduce new features, with a CAGR of up to 25% for the global public cloud market size from 2021-2026, becoming a core growth point in the future.

At present, Google has gradually become a leading IaaS and PaaS provider by strengthening the quality and level of cloud platform services, expanding its business scope, and merging and acquiring several companies at the same time. In terms of strengths, it primarily focuses on three key aspects: revenue and profitability, sales execution capability, and sovereign cloud capability. This focus enables the provision of competitive platforms, aggressive market share expansion strategies, and consistent local development and operational experiences through sovereign cloud solutions.

3.3. Advertising Business

Google's core competence is reflected in the advertising part of Google's services. Google's advertising business relies on the support of its global search ecosystem, which integrates products such as Google, Gmail, Google Maps, and YouTube to seamlessly connect users across different aspects of their needs (e.g., search, email, maps, and video, etc.). These integrated product collections increase users' stickiness to Google's products [12]. According to a report by Shanghai First Securities, big events such as the 2024 Paris Olympics, the UEFA Europa League, and the U.S. presidential election will bring incremental growth to the advertising business. Google plans to incorporate generative AI into its advertising business. This technology will create materials tailored to user profiles, streamlining the production process for advertisers. Additionally, it will optimize search ads and enhance the shopping experience for users. This includes the implementation of an AI virtual try-on service, which could attract more advertisers to increase their marketing investment [13].

4. SWOT Analysis of Alphabet

SWOT analysis can help to understand the strengths and weaknesses of the business areas under a company's banner and develop strategies from them to help the company deal with different situations. Therefore a certain level of business analysis of Alphabet using the SWOT analysis model can help us to better understand the current development of Alphabet.

4.1. Strengths: Wide Range of Products and High Usage Rate

Google has built a huge ecosystem in the mobile device space by launching the Android mobile operating system. And it has captured a share of the smartphone market. Though Android is available for free, it has opened up opportunities for Google in terms of advertising and application sales, as well as providing mobile phone manufacturers with a standard for developing their devices. This gives Google a diversified revenue stream and strategic position in different markets. On the other hand, the Android operating system is also used for commercial purposes, providing remote access to sensitive official data. This is because Google has opened its source code to the public and has contributed to many open-source projects. This open-source contribution not only helps to promote technological innovation and attract more technology companies to participate in it for development and financing but also helps Google to build a strong ecological network system [14].

Google's business model innovation can also be reflected in Google's cross model of free products and advertisements. Google provides many free products and services, such as Google Search, Gmail, Google Maps, and so on. These free products have attracted a large number of users to try out the products while providing more exposure for the advertising business. Compared to other office software, for example, Microsoft's Office 365 uses a subscription system, which means that users

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need to spend money before they can enjoy Microsoft's products and features. The advantage of this is that it can attract many users for Google and maintain a certain degree of user stickiness. The crossover model between free products and advertising allows Google to offer high-quality free products and realise advertising revenue at the same time. For example, in the case of adverts on Google Maps, business information is communicated to potential customers, especially in terms of local and mobile searches. At the same time, this provides users with more personalised and useful information to help them find the businesses and services they need. This combination of ads provides Google with ad revenue while providing users with a more valuable mapping and navigation experience. The same goes for the crossover model on YouTube, which recommends relevant ad content based on a user's search content and preferences for some personalised push.

4.2. Weaknesses: The Brand vs Product Dilemma

In the past, Google was widely regarded as the world's most advanced search engine. However, a significant shift occurred in 2015 with the establishment of Alphabet, marking a pivotal moment in Google's evolution. This change led to innovative transformations in Google's business model. Alphabet strategically redirected its focus towards cloud computing services, investing extensively in product development and iterations. Consequently, this shift caused a sense of "cognitive dislocation" among users, blurring the lines between Google as a product and Google as a brand. Users became uncertain whether "Google" referred to a specific product or a broader brand entity. According to the survey, in the future, Alphabet will be a company brand, which stands for leading innovation and high technology; while Google is a product, which is "the world's leading search engine". In 2017, Google announced that the company's strategy has been changed from Mobile First to AI First, and in the next 10 years, Google will shift to build an AI-first world [15]. Alphabet has become the world's most valuable technology company after years of development, with a market capitalisation of more than a trillion dollars.

4.3. Opportunities: Innovation in Automation Projects

In 2009, Google set up an internal self-driving project called Waymo, which can provide a wide range of services such as taxi hailing, transport, etc. Waymo Driver uses automated driving. The passenger simply waits for the Waymo Driver to deliver him or her safely to his or her destination. Waymo Driver must first fully map the area, including basic information about road conditions, various road signs, and pedestrian crossings, before it can begin operations. In order to determine precise road locations at any given time, Waymo Driver combines these very accurate customised maps with real-time sensor data, rather than relying solely on external data such as GPS with unpredictable signal quality [16]. Not only that, Waymo uses active learning to train its models, utilising Google's deep learning framework, TensorFlow. TensorFlow is an end-to-end machine learning platform that provides solutions for data preparation, building machine learning models, model ministry, and implementation of various machine learning task stages. All in all, the combination of self-driving technology and deep learning frameworks marks a breakthrough in product innovation for Google.

4.4. Threats

4.4.1. Higher cost risk

Considering the company as a global technology giant unique ecological competitiveness, advertising, and cloud business resonance superimposed on the commercialisation advantages of AI products is becoming apparent. This paper argues that Google has a complete accumulation of large model technology and can rely on AI to stimulate the commercial realisation of advertising and cloud

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services [16]. However, Google still has a greater risk in the cost structure, mainly because the development of AI applications is less than expected; the company's R & D progress is less than expected; systemic risk; policy risk; research report data update is not timely. At the same time, the profit model of cloud computing services is still in the exploration stage, and the subsequent progress of commercialisation is yet to be observed.

4.4.2. The risk of increased competition in cloud computing

In terms of revenue volume, Google's cloud computing service "Google Cloud" has a late start and low share compared with its competitors, and there is still a lot of room for growth. The main competitors of Google's cloud service are Amazon's AWS and Microsoft's Azure. In terms of revenue volume, Google and its competitors, compared with the late start, and low share, there is still a lot of room for growth [15]. In addition, the price advantage brings no small cost warning. Google Cloud's price is 20% lower than AWS's making it possible for Google's cloud business to accumulate a loss of $14.6 billion over the past three years, mainly due to the large amount of money it has invested in expanding its infrastructure, developing new products, and recruiting new customers and talent.

4.4.3. Risk of regulatory uncertainty

The Guardian newspaper in the UK published the account of an anonymous whistleblower at Google accusing Google of misconduct in the handling of sensitive health data in 2020. The whistleblower worked for the Nightingale Project, Google's attempt to enter the lucrative US healthcare market, where Google employees have full access to non-anonymised patient health data. Therefore, a scientific approach to regulation is an important way to improve the reliability of big language models [17].

In October 2022 the US White House released the Blueprint for an Artificial Intelligence Bill of Rights, the blueprint revolves around the five areas of safe and effective systems, prevention of algorithmic discrimination, protection of data privacy, notification and clarification, and human participation in decision-making, which provides a supportive framework for AI governance, but will also involve significant legal modifications and technological complexity [18].

5. Recommendations for Regulatory Measures

5.1. Processes should be more transparent

It is important for participants to be clear about what their data is being used for, and where and by whom it is being used and processed. Therefore, private user data obtained on other platforms needs to be retained in the context of mutual clarity between the parties. Platforms must not expose personal privacy to the general public unless the user consents to the sharing of such data for further research.

5.2. Users should give explicit consent

The storage and processing of data always requires the prior explicit consent of the data subject. Explicit consent means that users need to be informed of what their data is used for, where it is stored, and how their data will be used in the future before the project begins. Users also have the right to decide whether the data will be shared in an anonymised or identifiable form.

5.3. Platforms should anonymise data

Traditional anonymisation techniques are increasingly challenged by new technologies such as machine learning, so scientists need to pay more attention to this topic. Simply removing date of birth,

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postcode and gender has proven to be ineffective. Using newer and more complex methods (e.g., k-Anonymity) is a better solution, although still not a sure way to ensure anonymity [19].

5.4. Google should engage in ethical reflection

Researchers should ask themselves broader ethical questions about their research. These questions are not new and have been the focus of ethical research for decades: do users consent to sharing their data, and do they benefit from sharing their data? A negative answer does not in itself prevent data sharing and processing, but the direct user benefit makes it easier to justify the research. Whether enough effort is put into maintaining privacy, including strict anonymisation systems, whether trust/confidentiality is maintained between healthcare providers and patients, and a host of other issues [20].

6. Implications from Google

6.1. Strategic Model Innovation

Google abandoned the traditional large enterprise model and announced the establishment of Alphabet in 2015, and shifted from the "Mobile First" strategy to the "AI First" strategy in 2016. The most important reason for the restructuring of Alphabet was to enable its subsidiaries to remain agile and continuously innovate, and the independent companies under Alphabet have their own corporate cultures, processes and leaders [16].

6.2. Systematic and Dynamic Drive for Growth

How do organisations maintain the ability to adapt and shape their environment when it is changing rapidly? This research question has provided a solution through dynamic capability modeling [21]. Perceive their environment through IS that interacts with it; to interact with customers/consumers of production and benefit from crowdsourcing, companies need to deploy systems to monitor the use of new products, customer sentiment analyses and dashboards, big data mining, and their social media.

6.3. Focusing on Awareness Development of The Company's Employees

Conscious organisations are in part a reaction to modern organisations, which have to use complex technologies that are difficult for human operators to understand and are therefore prone to unpredictable but inevitable accidents. Google applies the ideology to its organisation and its organisational members become aware of the possibility of failure and pay close attention to the details of organisational complexity; a focused organisation filled with challengers of the status quo, sceptics, attentive listeners, divergent thinkers and innovators.

6.4. Continuous Innovation

For domestic Internet company enterprises, continuous product innovation and business model innovation is a much-needed breakthrough. Google's internal organisational innovation began with the business model, which belongs to the portal model of e-commerce. Google system of Internet search core production activities are free, but it creates digital "real estate" and sold to advertisers. Pioneered by Yahoo, which merely replicated the Yellow Pages model on the web, the Google model is novel in that it employs an original search algorithm that uses backlinks to refer to a given web page.

The index is constantly updated within seconds to ensure the freshest results are searched; voice search is being continuously improved and runs in 38 languages on mobile platforms [22].

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7. Conclusion

This paper uses the SWOT model to analyse the innovation of Alphabet. The global internet has grown rapidly over the last few decades and has given rise to several businesses that are integrated with the internet, Alphabet is a technology-based company with many different businesses that cover a wide range of areas. For example, Google's search engine and cloud computing businesses account for the majority of the market, bringing positive benefits to Alphabet. In addition to this, the majority of Alphabet's revenue comes from advertising, which together with other commercial products has become Google's core competence. These business model innovations have brought Alphabet a degree of market share and user stickiness and have opened up a new path for product innovation. However, after Alphabet completed the restructuring of the IPO, it faced some difficulties, such as the ambiguous definition of product positioning for users, or the development of AI not proportional to the capital investment. Furthermore, there may be some unfair competition in the industry, including some private information leakage, which is worth reflecting on the issue of information security. Therefore, this paper argues that some regulatory measures are necessary, and that the Internet leakage of patient privacy has prompted companies to improve privacy protection, and that the relevant processes should be made more transparent, informing data sources of what their data will ultimately be used for, and that their consent should be sought and obtained. The paper also argues that data on platforms should be anonymised to help with data protection and, most importantly, that Google needs to engage in an ethical rethink of itself. Of course, it is undeniable that Google's inspiration for domestic companies is very significant. The innovation of the strategic model allows domestic companies to emulate the model and systematically strengthen their development. Equally important is that companies need to focus on the development of employee awareness, only employees have the development of the vertical depth of the work, and it is possible to carry out continuous innovation in the work.

Authors Contribution

All the authors contributed equally and their names were listed in alphabetical order.

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