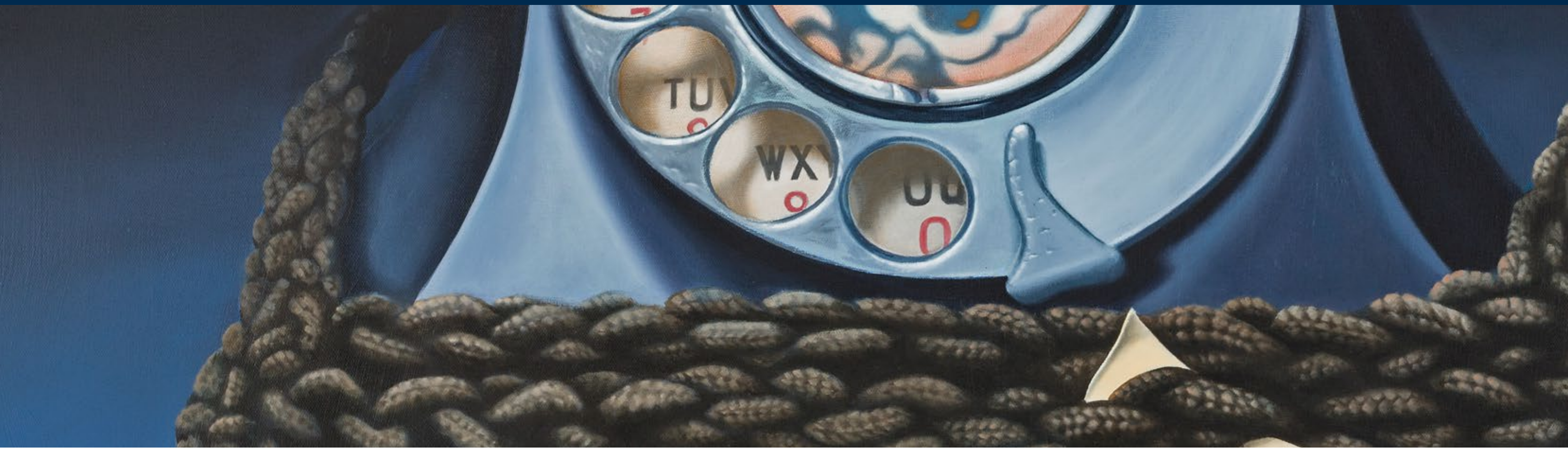

MICROSOFT VS GOOGLE AND THE FUTURE OF SEARCH

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Microsoft's announcement that it was launching an all new, AI-powered Bing search engine and Edge browser, combined with aggressive rhetoric on competition, has raised questions for Google around potential share loss, margin pressure and more fundamentally, the future of search. Whilst it is still too early to guess at the potential impact of these developments, we believe Google is more than well-equipped to fend off this challenge to its dominance.

In 2015, Sam Altman and Silicon Valley heavyweights, among them Elon Musk and Peter Thiel, founded the artificial intelligence (AI) laboratory OpenAI. Seven years later, OpenAI launched ChatGPT, an advanced chatbot that uses generative pre-trained transformer models, a form of large language model originally developed by Google in 2017. By feeding huge volumes of pre-selected data into a large AI algorithm with many billions of parameters, OpenAI has made ChatGPT both 'knowledgeable' and 'human-like' in its responses.

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In 2019, Microsoft provided OpenAI with a US$1 billion investment, following up with a second multi-year investment in 2023 of $10 billion. The deal reportedly gives Microsoft 75% of OpenAI profits until these investments break even, after which it will receive a 49% stake in the company. Microsoft will customise and integrate OpenAI technology into its product suite, starting with Bing, Edge and Office365. The massive data crunching will run on Azure, Microsoft's cloud computing platform, and will be powered by Nvidia hardware.

AI – A BRAVE NEW WORLD?

Since launch, ChatGPT has captured the public's imagination with its versatility and ability to mimic human conversation. It can write and debug computer code, compose poetry and lyrics, write essays, answer test questions, suggest holiday itineraries, give general advice. It is also frequently inaccurate. In a tweet, OpenAI CEO Sam Altman cautioned: "ChatGPT is incredibly limited, but good enough at some things to create a misleading impression of greatness. It is a mistake to be relying on it for anything important right now. It is a preview of progress; we have lots of work to do on robustness and truthfulness".

"ChatGPT has captured the public's imagination with its versatility and ability to mimic human conversation"

Asked to list its own shortcomings, ChatGPT highlighted common-sense reasoning; understanding context; recognising sarcasm and humour; understanding complex language structures; and incorporating external knowledge. It is not 'true AI' in the sense that it possesses general intelligence but rather 'narrow AI' in that it was designed for a particular task. ChatGPT is, in effect, a very sophisticated parrot.

Gary F. Marcus, professor emeritus of psychology and neural science at New York University, has written extensively on GPT-3, its possibilities and its limitations. Responding sceptically to bold predictions that the unleashing of Chat-GPT signalled "code red" for Google, Marcus pointed to both the technology's tendency for *discomprehension* – mindless answers that show the system has no real idea what it is talking about – and *hallucination* – pulling together both truths and falsehoods in one seemingly authoritative answer.

For Marcus, GPT-3 technology is the "king of pastiche", a curious mixture of brilliance and stupidity that will take many, many years to develop satisfactorily. Using the example of the driverless car as a much-heralded innovation that took far longer than predicted to get to where it is today, he warns that in our "quest for a new-fangled search, I suspect we are once again in for a rough ride."

CAN MICROSOFT EAT GOOGLE'S LUNCH?

Despite OpenAI's current technology shortcomings, Microsoft's announcement that it was launching an "all new" AI-powered Bing search engine and Edge browser has generated a great deal of excitement. By applying the AI model to Bing's search ranking engine, and by overhauling Bing's architecture, Microsoft is promising an improved, and importantly better, Google Search experience. Currently, Microsoft estimates that half of searches do not deliver what people want.

Displaying traditional search results alongside the chatbot function, Bing will, theoretically deliver better, more precise results and a superior user experience. The bot is also being integrated into the Edge browser, allowing users to benefit from the productivity enhancements of the AI model. To use Microsoft's phraseology, these tools will serve as an 'AI co-pilot for the web'.

Since Microsoft's announcement, the share price of Google's parent company Alphabet has been weak. The pressure was exacerbated by the rather unsuccessful public unveiling of the company's own experimental Google Bard chatbot, a seemingly rushed response to the intense interest in AI language models.

Bing and Edge are theoretically competitors of Google Search and Google Chrome, although by size there is little comparison. While Bing and Edge have a 4% and 7% market share respectively, Search and Chrome dominate with 93% and 65%. Microsoft's rhetoric is bullish, however. CEO Satya Nadella has described this as the biggest innovation in search for two decades and has indicated that he is prepared to undercut the gross margins in the industry 'forever' given the size of the opportunity and the profitability of the market. Some observers estimate that every one percent share taken form Google equates to $2 billion in revenues for Microsoft.

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ASSESSING THE CHATGPT THREAT

If we were to summarise the market's current concerns for Google, it would be some combination of the following factors:

- Bing takes traffic share from Google
- Integrating GPT-like functionality into Search and Chrome leads to structurally higher operating expenditure
- GPT-like functionality impairs search monetisation.

Strategically, Google is now perceived as having everything to lose and nothing to gain, whilst the opposite is true for Microsoft. However, with the caveat that it is still far too early to assess with any degree of accuracy or confidence the potential impact on Google, we take the view that the company is very well equipped to respond to the perceived threat from Microsoft.

- **Bing takes traffic share from Google – unlikely**

In the short term, Microsoft could convert some of the 'ChatGPT mania' into market share gains for the new versions of Bing and Edge, although both are still in very limited release to help manage costs for Azure.

Over time, however, we don't expect much change to the existing market share balance. ChatGPT is not a proprietary algorithm – indeed, the fundamental technology was developed by Google in 2017. Despite its initial blip, Google Bard is backed by the indexing of Google Search, as well as an integrated search function providing generative responses. More details on Bard are likely in the coming months, and whilst Microsoft may have first-mover advantage, it is unlikely to prove enough or to last due to Google's three very significant advantages across three areas:

- *Search Channels*

Google owns Android, which has over 70% of the mobile operating system market. Google's products are default on Android, as Microsoft's are on Windows. On Apple's iOS, Google Search is the default engine on Safari. In effect, Google Search is effectively the default on all browsers except Microsoft Edge. Taking share from Google on mobile and desktop means undoing years of user loyalty and operating system inertia. The lack of operating system control allowed Apple to effectively knee-cap Meta a couple of years ago. It will be much harder to do the same to Google.

- *Product Suite*

Google has nine consumer-facing products with over one billion users – all of which are free. Not only are Google's data gathering and indexing capabilities unmatched (AI is only as good as the data you feed it) but so too is its ability to deliver value, productivity and 'buzz' to users via AI.

- *Brand*

Google is a verb. It is synonymous with search. While Microsoft's search advertising revenues increased significantly from 2012 to 2022, this did not impact Google's dominance. Wresting millions of users away from Google and towards Bing will be a difficult task. Advertisers have years of experience placing high-traffic, high return-on-investment ads with Google via Search, YouTube, AdMob, Maps, Shopping, and Travel, but less so with Microsoft. They will need solid proof that eyeballs are sustainably switching to Bing before the dollars start moving too.

- **Integrating GPT-like functionality into Search and Chrome leads to structurally higher operating expenditure – likely**

The extent to which integrating this technology will impact Google's expenditure is highly speculative and depends on a huge number of variables. Will Google use a full large language model or a 'lite AI' version? What percentage of global queries will have generative responses? What about the length of response? The level of user engagement? Advances in AI algorithms? The list goes on. Early estimates of the impact vary wildly but, in truth, nobody knows.

In Google's defence, its in-house processing unit likely has a structural cost-per-compute unit advantage over the Nvidia hardware used by Microsoft. Another consideration are the recent comments made by Alphabet about optimising the company's cost structure. Management might consider reallocating some of the fat in other areas of the business to Search, helping to preserve overall margins.

- **GPT-like functionality impairing search monetisation – unknown**

The rationale for this argument would be that because GPT functionality 'solves' the query, the user would have to click on fewer paid links or no links at all. But as Google's founders remarked many years ago "Search will never be a solved problem". It is also worth remembering that not all Google searches lead to ad revenue, so every 'solved' query does not necessarily replace a paid click. In fact, in a 2020 blog post, Google stated that 80% of searches do not have any ads, and only a small fraction – less than 5% – have four top-text ads. This is consistent with independent studies that suggest that less than 2% of Google searches convert a paid click.

"As Google's founders remarked many years ago 'Search will never be a solved problem'"

Google has also increased the number of queries resulting in 'zero clicks' to an estimated 25% (where Google displays the answer directly) and it has done so without any apparent impact on the growth of Google Search. The only difference between these answers and GPT-like answers is the 'human response' factor. More generally, the

most ‘ad-intensive’ search results are those with strong commercial intent, which in many cases have no right answer. This could be looking up clothing, home furnishings or any other items where selection is dictated by personal choice.

CONCLUSION

In the last few weeks, Microsoft has raised the competitive stakes in areas that Google has made its own. The market’s negative reaction to date suggests that some view this as a potentially significant threat to Google’s dominance. We think this unlikely in the medium term. This does not denote complacency: Microsoft is a truly world class business and its intentions should be taken seriously – in truth, the true benefits of AI technologies may not flow to Bing but rather to other areas, such as Office 365, Dynamics 365, GitHub, and Gaming. But this is a technology still in its infancy, with a long-term impact on the competitive dynamics of search and browser that is almost impossible to gauge with any confidence. And while we will monitor closely its evolution, we believe Google’s inherent strengths, alongside its own emerging AI technologies, are powerful barriers to this incipient challenge.

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