

## Content Generating AI

### Hey ChatGPT, write me a patent describing your invention...

***Content generating AI has the potential to disrupt a wide range of knowledge and intelligence-based industries. OpenAI has captured the public's imagination, but its lack of a defensive patent strategy coupled with a projected revenue over \$1 billion in the near term exposes it to material risk of inbound assertion from innovators and invention owners in the space.***

Microsoft announced in January 2023 the third phase of a long-term partnership with OpenAI to accelerate AI breakthroughs. This multibillion-dollar investment, rumoured to be around US\$10 billion, follows on from previous investments made in 2019 and 2021 and extends the companies' collaboration across AI supercomputing and research. OpenAI describes itself as an AI research and deployment company with its mission being to ensure that artificial general intelligence benefits all of humanity. The company was originally founded by tech investors including Peter Thiel, Elon Musk, Reid Hoffman and Sam Altman in 2015 and is headquartered in San Francisco, California.

OpenAI just recently went viral with widespread publicity following the November 2022 launch of a free preview of its AI chatbot ChatGPT. The GPT stands for Generative Pre-trained Transformer. It is based on a language model called GPT-3 which is trained on large open datasets and aimed at generating natural language answers to questions, but with other functions including translation and improvised text generation. With OpenAI's projected revenues now forecast to exceed \$1 billion by 2024, ChatGPT-3 has the potential to open up a whole new market opportunity around content-creating AI, launching a completely new way to interact with information and generate complex answers to a myriad of questions.

Interesting is the fact that OpenAI does not appear to have any published patents either pending or granted. In a blog post titled 'Introducing OpenAI' published in 2015 the company founders shared their aims which included 'As a non-profit, our aim is to build value for everyone rather than shareholders. Researchers will be strongly encouraged to publish their work, whether as papers, blog posts, or code, and our patents (if any) will be shared with the world. We'll freely collaborate with others across many institutions and expect to work with companies to research and deploy new technologies.' This open-sourced approach may work for a non-profit with idealistic goals but now presents risks to OpenAI's commercial strength given its shift in 2019 towards a for-profit model. Patents are a great way to demonstrate priority and to protect against assertions from both non-practicing entities (NPEs) and technology competitors.

OpenAI is likely an outlier in high-tech in terms of its lack of appetite for patents. Most organisations, particularly for-profits, are proactive in protecting future revenues against license assertions and take steps to develop an intellectual property strategy to mitigate that risk. Patents are a key part of a technology rich IP strategy. Despite the zero patents identified for OpenAI, in this note, we look at published patents across Content Generative AI to identify key innovators and invention owners in the space. These organisations represent potential assertion threats to OpenAI, given its high projected revenue, investment from Microsoft and lack of a defensive patent strategy, but many are also likely to be key participants in what appears today a relatively nascent but high growth, high-tech disruptive market opportunity.

### Cipher Technology Insight

*At Cipher, we support many of the world's largest organisations on innovation intelligence specific to technologies that are changing the world. For information on how you can access critical insight on disruptive innovation specific to your business and industry, please get in touch.*

## Key Messages

- OpenAI has pursued an open-source strategy in development of its technologies and does not appear to have any published patents at all. This is consistent with its open-source strategy but exposes the company to material risk of inbound assertion associated with patent infringement from patent owners in Content-Generative AI as its revenue grows.
- OpenAI have an estimated patent licensing risk of \$80m which will only grow if they their \$1bn revenue prediction.
- IBM has the largest portfolio overall, with over 120 families published, but with an average PVIX score of just below 50, their portfolio appears relatively weak when compared to their competitors.
- Microsoft likely has the strongest generative AI portfolio if we consider number of grants (66 patents) and their average PVIX, 59. Salesforce and Intel have the highest average PVIX, 67 and 64 respectively, but far fewer grants (11 and 5 patents).
- OpenAI has a strong partnership with Microsoft but faces risk from other leading companies in the field such as Google. With an expected explosion of generative AI offerings in the near future, not all will succeed, which could leave some of these companies looking to monetise their portfolios
- There are currently few relevant patents held by NPEs, indicating the risk is currently quite low. However, as generative AI becomes more profitable, a large pool of small companies, universities, and individual owners may begin selling their patents to NPEs, so there is potential for this risk to increase.
- There has been an explosion in patents published in the last five years which has determined the current technology leaders. Some portfolios have gone from near-zero to industry-leading, suggesting it is not too late for OpenAI to change strategy.

## What can OpenAI's ChatGPT tell us?

To investigate OpenAI's patenting strategy, we asked their landmark product, ChatGPT, to walk us through it, and we think that it has summarised the risks it faces quite well.

**Cipher:** *Does OpenAI hold any patents?*

**ChatGPT:** *It's unclear whether OpenAI currently holds any patents as the company does not publicly disclose information about its patent portfolio. However, based on the company's mission, OpenAI is focused on advancing artificial intelligence, which is a field with a lot of innovation and research and therefore it is likely that they might have applied for some patents to protect their innovations and research. Additionally, OpenAI has partnerships and collaborations with other companies and organizations, so it is possible that patents related to the technology or research developed through these partnerships are held by the partner companies or organizations.*

*It's worth mentioning that OpenAI is an open-source-friendly company and they release most of their research, models, and tools as open-source which means they do not require a patent to protect their work in order to share it with the community*

**Cipher:** *What patent risks does OpenAI face?*

**ChatGPT:** *OpenAI faces a number of patent risks related to its technology and research. One potential risk is that other companies or organizations may try to patent similar technology or research methods that OpenAI is working on, which could limit OpenAI's ability to use or commercialize that technology. Additionally, OpenAI may also face patent infringement risks if its technology or research methods are found to infringe on existing patents held by other companies or organizations.*

*Another risk is that OpenAI could have trouble protecting its own patents. For example, another company or organization could challenge the validity of OpenAI's patents or try to have them invalidated. This could lead to costly legal battles and potentially limit OpenAI's ability to license or monetize its technology or research.*

*Additionally, OpenAI may also face potential risk related to the use of open-source software. Open-source software can be freely used, modified, and distributed by anyone and it is a possibility that someone could use OpenAI's open-source software to create a similar product or service without permission, which could lead to potential legal issues.*

*Lastly, OpenAI may also face regulatory and policy challenges. For example, the development and use of AI technology raises ethical, legal and societal questions, which could lead to new laws and regulations being put in place that could impact OpenAI's business.*

**Cipher:** *Does pursuing an open source policy help or hamper OpenAI's patent risks?*

**ChatGPT:** *Pursuing an open source policy may help mitigate some patent risks for OpenAI, but it could also create new challenges.*

*On the one hand, by releasing its technology and research as open source, OpenAI can establish prior art for its work, which can make it more difficult for other companies or organizations to patent similar technology or research methods. Additionally, by making its technology and research open source, OpenAI can also potentially attract a larger community of developers and researchers who can contribute to and improve upon its work, which can further strengthen its patent portfolio.*

*On the other hand, by releasing its technology and research as open source, OpenAI may also expose itself to potential patent infringement risks from other companies or organizations that hold patents on similar technology or research methods. Additionally, OpenAI may also face challenges in protecting its own patents if its open-source technology or research is found to infringe on existing patents held by other companies or organizations.*

*Furthermore, open-source software can be freely used, modified, and distributed by anyone, which could lead to potential legal issues if someone uses OpenAI's open-source software to create a similar product or service without permission.*

*In summary, while pursuing an open source policy may help mitigate some patent risks for OpenAI, it could also create new challenges and potential legal issues. Therefore, OpenAI needs to be very careful in managing their open-source policy while keeping their patent risks in mind.*

## Top Innovators in Generative AI using classified patent data as the primary indicator

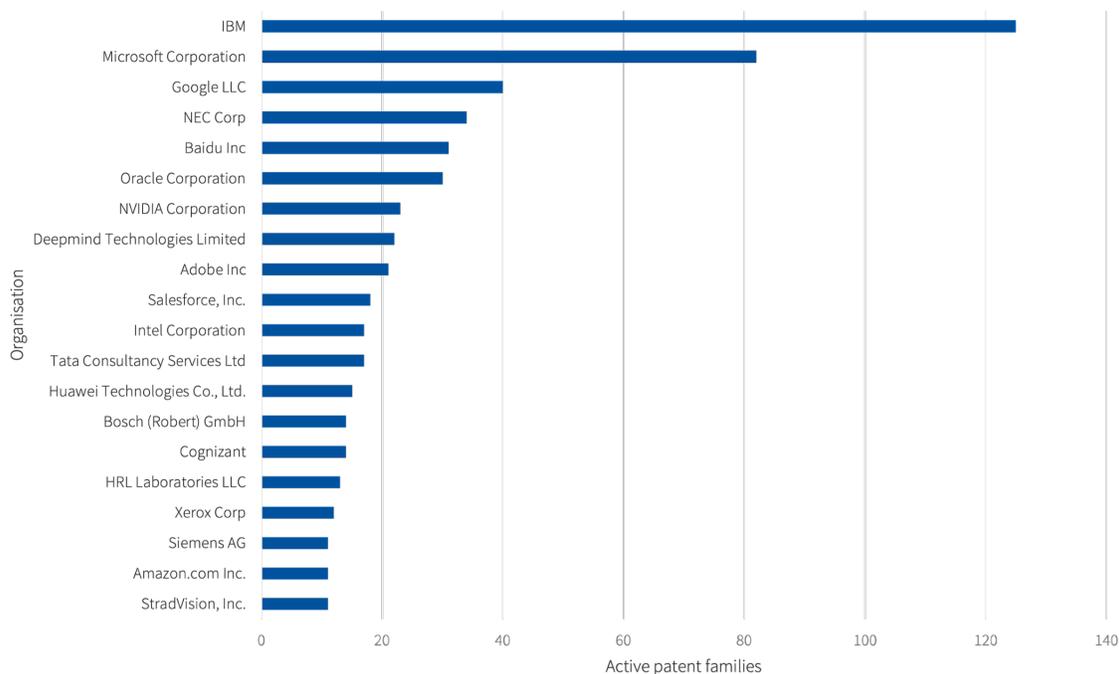
The top three generative AI patent owners in this search are IBM, Google, and Microsoft. Others include a range of tech companies such as Oracle, Salesforce, and Amazon. Microsoft and OpenAI have been partnered since 2019, and this has resulted in the 2021 release of Github's Copilot to aid with programming, as well as the upcoming incorporation of ChatGPT into search engine Bing. With billions invested in OpenAI, it is likely that Microsoft would not only license its patents to OpenAI, but it would also provide support in the case of an inbound assertion.

Many of the other companies in this list already have AI powered tools of their own, such as IBM with Watson, Adobe with Sensei, and Salesforce with Einstein. While these wouldn't necessarily be considered as generative AI yet, it is likely that attempts to incorporate conversational aspects will begin quickly. Salesforce recently announced EinsteinGPT, which will likely use the GPT-3 language model developed by OpenAI to enhance their AI tool. Another example in the past week has been the rocky launch of Google's Bard, which is expected to be a direct competitor for ChatGPT. Alphabet, Google's parent company, also owns another leading company in this sector, DeepMind Technologies. Between these, Alphabet has a very large portfolio, but could they assert against OpenAI if Bard continues to lag behind?

The other companies on this list will also likely be developing generative AI models to add to their services, and this is expected to be a key battleground in the near future, and not all AI offerings will be successful. Given that OpenAI is predicted to reach revenues in the billions by 2024 but has no patents of its own, the benefits of an assertion could be two-fold: OpenAI may struggle to defend against a litigation with only licensed patents; and without patents, it may struggle to retaliate directly. This means that a large company who has a strong portfolio but failing product could see an assertion against OpenAI as a relatively low-risk move.

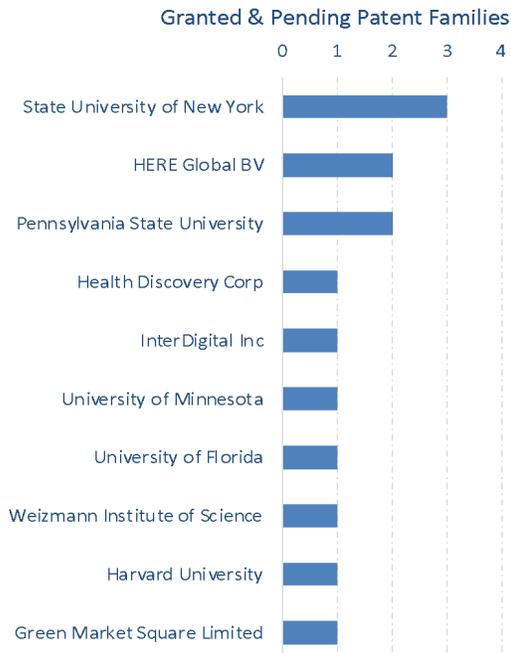
However, an even greater risk could lie outside of the top IP owners. The top twenty companies account for less than half of active US patent families, indicating that there is a wealth of owners with only one or two patents. These smaller owners are less likely to have AI offerings of their own, and may become motivated to assert their patents. Even if they have licensing deals from Microsoft to help ward off these assertions, the workload required to respond to them all could become very costly. Another possibility is that these companies could begin to sell of their patents to NPEs.

Top Twenty Patent Owners



## NPE Risk: Low but with potential to grow

### NPE Top Owners: *Generative AI*



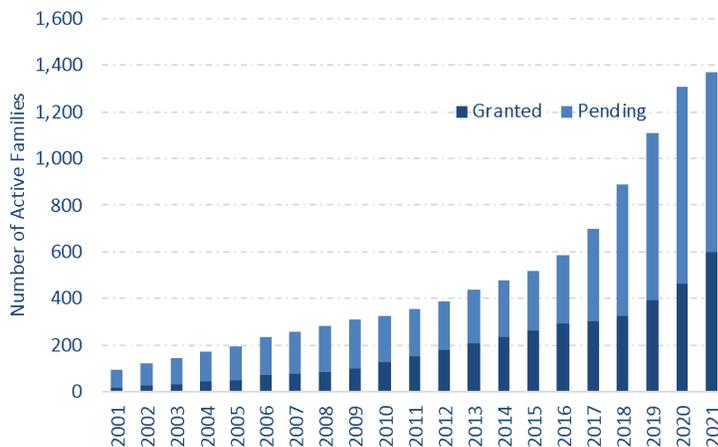
The NPE threat risk currently appears low, with only 29 Generative AI patent families owned by NPEs out of the 2,000 patent families identified in our classification exercise, the majority of which are universities.

Despite the apparent low risk, there have been examples of NPEs asserting against larger companies. For example, Health Discovery Corporation has had a long-standing dispute with Intel over its patents related to 'Support Vector Machine - Recursive Feature Elimination' technologies. There have been many back and forths in this dispute with no end in sight.

OpenAI's lack of patents could make it a clear target for any NPE owning IP in the field, and this will cause them problems even if it can use patents from partners, as it will suck time and resources from the company. Even universities have been asserting their patents at a growing rate over the last decade, so these could become another source of risk for OpenAI, particularly as patent portfolios grow with further research & development in the field.

## Patent Filing Trends

### Patent Filing Activity: *Generative AI 2001 - 2021*



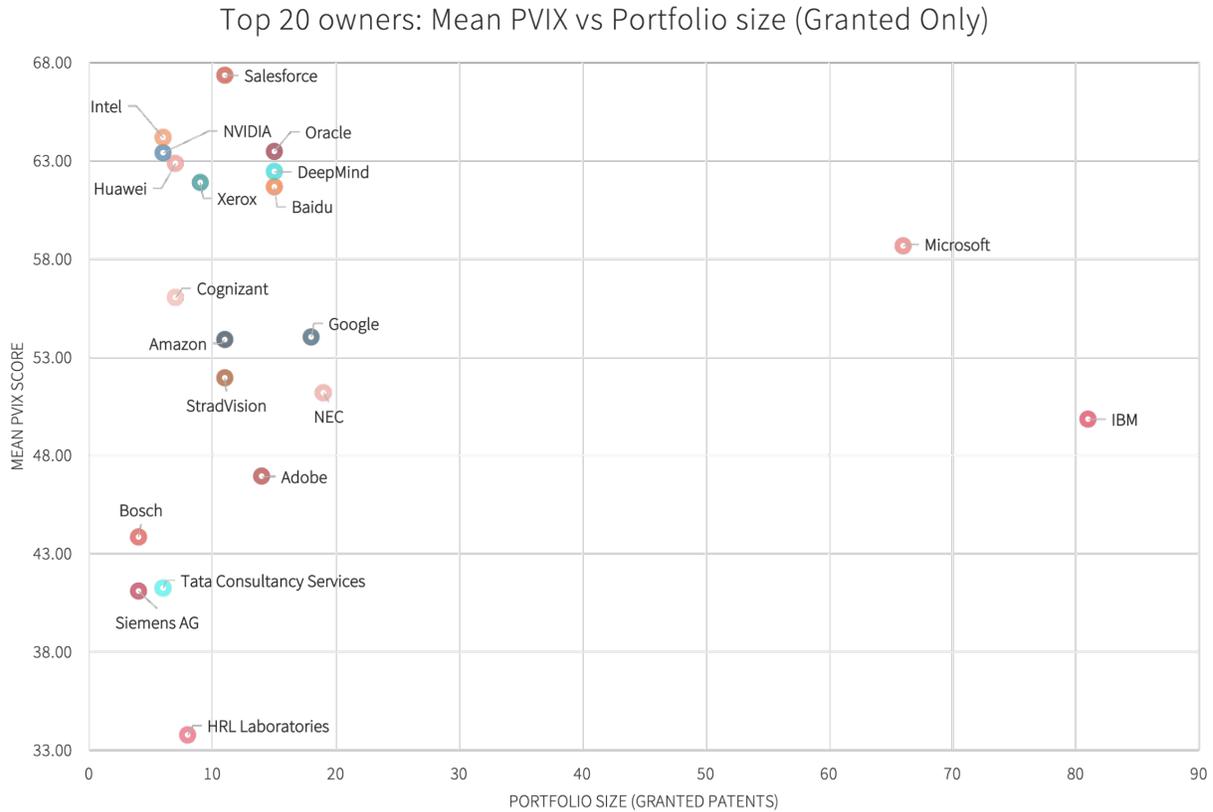
No surprise that patenting activity in Generative AI has increased over the last 20 years, but the last five have shown a particularly large increase in innovation activity. In 2017, the number of pending patents increased by 25% over the year before, and this has started to become realised in granted patents. There are now twice as many granted patents as there were at the start of this period. The current landscape is dominated by the innovators behind recent activity. For example, DeepMind, founded in 2010, did not begin aggressively patenting until 2015.

Their fast rise from near-zero patents to becoming one of the industry leaders could be a worrying sign for OpenAI, but it could also show that it is not too late for OpenAI to shift strategy and begin patenting.

Individual owners, share in filing activity has dropped from 16% of the total in 2001 to 3% in 2022. This confirms an increased appetite for Generative AI tech investment by tech and service companies and is a trend that is likely to continue. Individual owners who do not have the resources to monetise or use their patents may divest to NPEs who do, especially for older aspects of the technology that more recent developments are based upon. This pool of patents presents a risk to any commercial company in the field.

## Portfolio Strength

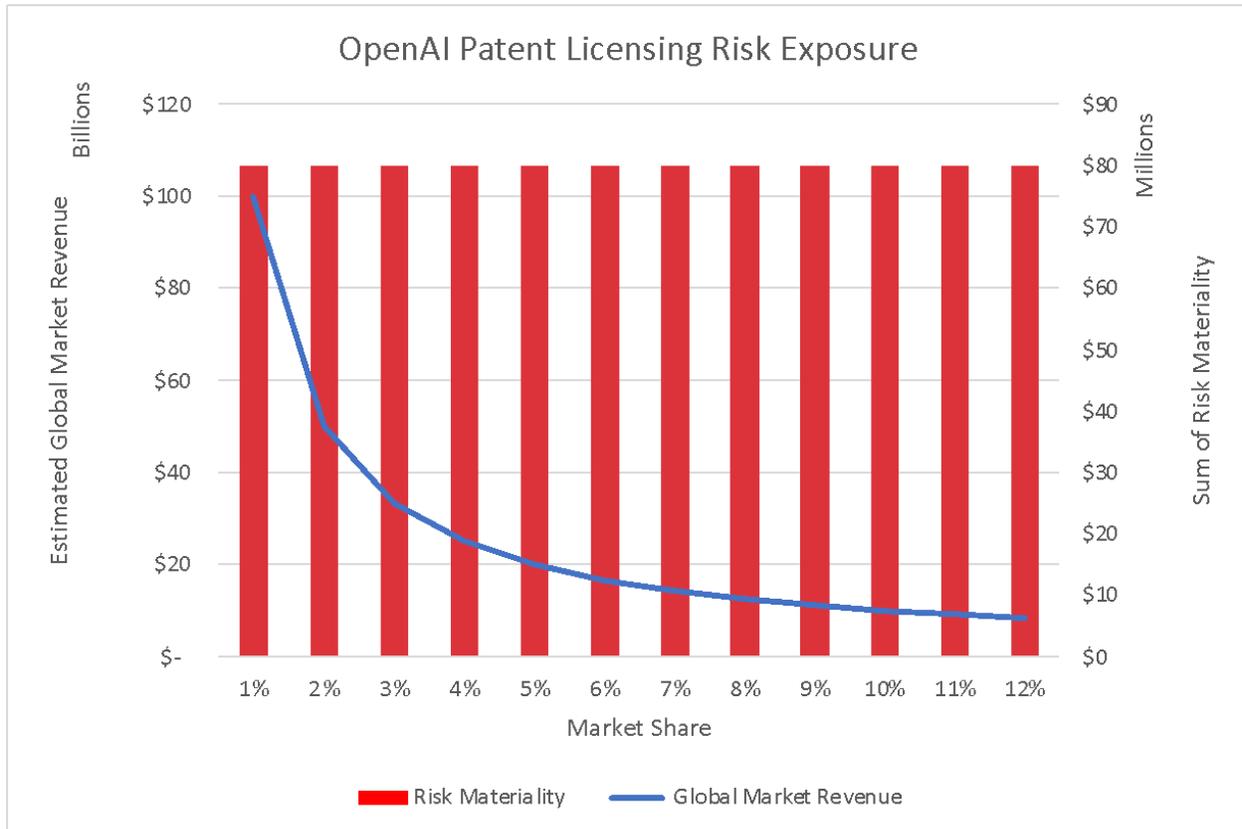
### Portfolio Strength PVIX vs Portfolio Size Top Owners: Generative AI



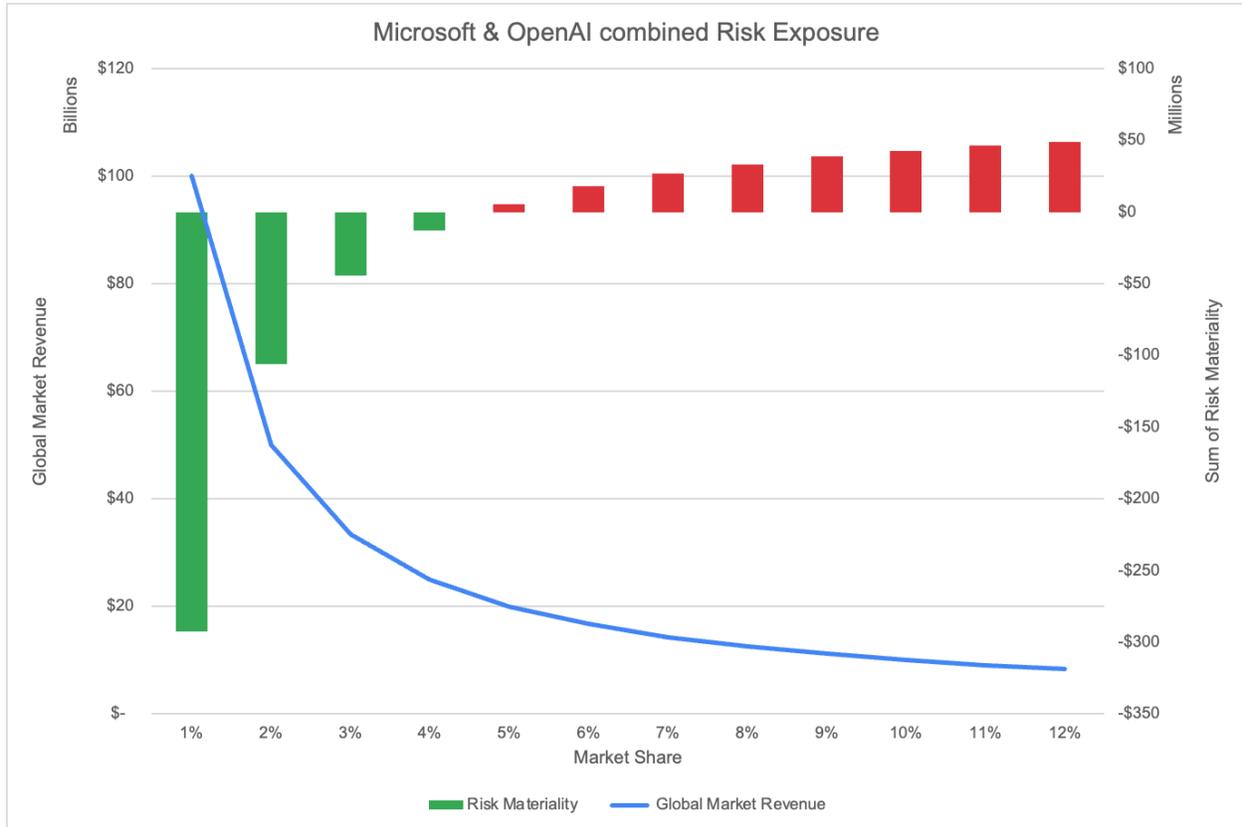
PVIX score is a metric that is used to estimate the relative strength of granted patent families. Comparing mean PVIX score and portfolio size for each organisation can give a better indication of who are the biggest players in a given sector than simply looking at portfolio size. In particular, the data used here is not a comprehensive look at the Generative AI landscape, so mean portfolio strength may be a better metric for who has the strongest portfolio.

Here, IBM and Microsoft are likely the two strongest portfolios due to their large portfolio size. The support of Microsoft would clearly be very valuable for OpenAI should they need to defend against litigation. However, there is a cluster of companies with higher PVIX scores on average, which includes: Salesforce; Intel; NVIDIA; Huawei; Xerox; Oracle; and DeepMind. The strength of these portfolios suggests a certain commitment to the developing Generative AI systems, and going to the future these are potentially key leaders to keep an eye on. Even in cases where products fail, the portfolio will remain and will present a risk to more successful companies, as well as any future entrants to the field who will not have the benefit of owning early patents.

## Estimating patent risk exposure



\$80 million is the scale of licensing risk OpenAI face without a patent to their name. This is a theoretical measure of the cost to acquire a license to all patent holders that relate to the ChatGPT. Note the cost stays fixed as OpenAI gain market share and we've assumed their projected revenues of \$1 billion and an 8% royalty rate. If OpenAI get even a single patent this can reduce their risk materiality by up to a half depending on other the companies market share growth. We can take this analysis a step further and extrapolate the patent protection offered to OpenAI if Microsoft cover them with their portfolio.



The risk situation changes if Microsoft can bolster OpenAI with their own portfolio of Generative AI patents. Both companies have sufficient overbalance up to 5% of the market share and even above that the risk tops out at just over \$50 million in licensing costs for the entire Generative AI landscape we were able to find. This hypothesis holds so long as revenues from ChatGPT stay at the predicted level of ~\$1B, if those go beyond that mark as is likely with Microsoft’s integration of the AI tool into their Azure and Bing products continues, then the case for filing even more patents to protect the crucial invention will become more pressing.

The risk analysis conducted here is full of caveats such as all patents being equal and relying on rational competitors who are willing to settle a licensed based on data and should not be taken as concrete. Where the utility of this lies is in demonstrating what value patents can bring, especially in very new, revolutionary, and soon-to-be profitable technologies such as Generative AI. Just one well-placed, filed and granted patent family can enable companies to reduce patent infringement risks significantly.

## Patent Classification Methodology

To find related patent families, the abstract was taken from each of OpenAI's published research papers and analysed using Cipher's 'Similar Families' tool which uses machine learning vectorisation to find patent families related to the text provided. The results from these analyses were refined using clustering to identify patents unrelated to Generative AI, and then combined to give an overview of the patent landscape around OpenAI's technologies and products. This method is not intended to produce a comprehensive list of patents in the field of Generative AI, but rather to provide an overview of the field's patent landscape using OpenAI's research as a lens.

To control for potential bias introduced by using only articles written by OpenAI, the same process was repeated using articles published by one of OpenAI's competitors, DeepMind Technologies. While there were some differences in the details, the overall messages and trends were similar. As such, this article focuses on the data generated from only OpenAI's publications.

## ChatGPT Conversations



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