

Direct Testimony of Prof. Michael D. Whinston

U.S., et al. v. Google LLC

United States District Court for the District of Columbia

October 16, 2023

REDACTED FOR PUBLIC FILING

Ex. No.
UPXD104
1:20-cv-03010-APM

- Determine, as a matter of economic principles, whether Google's conduct was or is likely to result in the creation, extension, or maintenance of monopoly power
- Determine whether any such conduct was or is anticompetitive and was or is likely to result in material harm to competition and consumers

3. Google's search distribution contracts give it exclusive defaults, which are a large driver of search traffic
4. Google's search distribution contracts foreclose rivals from a substantial share of each relevant market
5. Google's search distribution contracts have harmed competition to the likely detriment of consumers and advertisers

Opinion 3

Google's search distribution contracts give it exclusive defaults, which are a large driver of search traffic

- Apple must set Google as the default search on **all** instances of Safari
- Apple must ensure its Safari Suggest feature remains “substantially similar” to the way it operated in 2016
- Google has right of first refusal should Apple decide to run ads on Siri or Spotlight

- ✗ Offering a search choice screen
- ✗ Offering a different default in Safari's private browsing mode
- ✗ Offering different defaults by device
- ✗ Offering different defaults in U.S. versus rest-of-world
- ✗ Substantially increasing its own suggestions for users
- ✗ Running ads on Siri or Spotlight without giving Google the right of first refusal

Google's exclusionary Android agreements

MADAs

Signed by OEMs

If the OEM preinstalls **any** Google app, the MADA

- Requires the Google Search widget be placed on the default home screen
- Requires Chrome and GSA be undeletable and at least placed in a "Google" folder on the default home screen
- Prohibits implementing launchers and encouraging users to change the out-of-the-box settings such that they would no longer comply with MADA

RSAs

Signed by OEMs and carriers

To maximize the revenue share it earns, the partner must

- Set Google as the default on **all** search access points
- Not preinstall any alternative search service

(Also requires Google Search widget be placed on default home screen)

Competition is *not* “only a click away”

Trial Testimony



Gabriel Weinberg
CEO & Founder

- Q.** Do you find any roadblocks that consumers have in resetting defaults?
- A.** Yeah. I mean, I -- so I'd say broadly, the **search defaults are kind of the primary barrier** for people expressing their search privacy. They're -- like -- as I was just saying, they're **extremely powerful**. We find it empirically hard to get people to switch.

Trial Testimony



neeva **Sridhar Ramaswamy**
Former CEO & Founder

- A.** . . . And so being the default in that sense is enormously powerful because, you know, **pious prose around “competition being a click away,” notwithstanding in practice, they don't change.** And so it is a very powerful place to be.

Trial Testimony

branch

Alex Austin
Former CEO & Founder

- A.** . . . I think it's pretty well known, at least in the industry and . . . something that we've known really since we started, that **with utility products like Search, . . . generally, people use what's available, the defaults.** It's very challenging to get anybody to actually go out of their way and use some sort of alternative app or even download a new app. If it's not provided them as a default, if it's a utility product.

Trial Testimony



Microsoft **Jon Tinter**
Corporate VP of Business Development

- A.** . . . And so when you look at that, right, you say, okay, this is a platform where the users tend to use whatever it is you put in front of them and whatever it is the default, **being the default becomes unbelievably important, right. It's like, in some ways, everything else is chipping away at around the margins.**

- The internal projections and business decisions of Google, Microsoft, and Apple
- Behavior of search users

- Ordinary course business documents from Google, Microsoft, and Apple estimating the impact of Google losing search defaults
- Google's payments to search distribution partners

- Ordinary course business documents from Google, Microsoft, and Apple estimating the impact of Google losing search defaults
- Google's payments to search distribution partners

Google estimated that it would lose significant revenue without the Safari default

Default Search Recover Assumptions

^{Redacted} Safari Default Revenue Recovery

- **iOS Recovery:** ^{Redacted} based on...
 - **Apple Maps:** Google Maps lost ^{Redacted} of active users following Apple Maps launch
 - **Mobile Defaults:** Defaults have more prominence in mobile due to screen size and UI
- **MacOS Recovery:** ^{Redacted} based on ^{Redacted} revenue loss following Firefox US default switch, adj for WW MacOS Google Share
- **Total Recovery:** ^{Redacted} weighted average based on iOS-MacOS revenue mix

Google

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^{Redacted} Safari Default Revenue Recovery

- **iOS and MacOS Recovery:** Assumes all revenue subject to ^{Redacted} recovery based on:
 - Worst case assumption that all defaults observe similar losses and same organic recovery as Maps

2016

Q. Sitting here today, you don't know of any data point that's better than the Google Maps data for a recovery assumption on what might happen if Apple switched the default on iPhones, correct?

A. Off the top of my head, I don't know a better data point.

Mike Roszak



Google used its recovery estimates to evaluate the incremental profit it would earn from its deal with Apple

Redacted

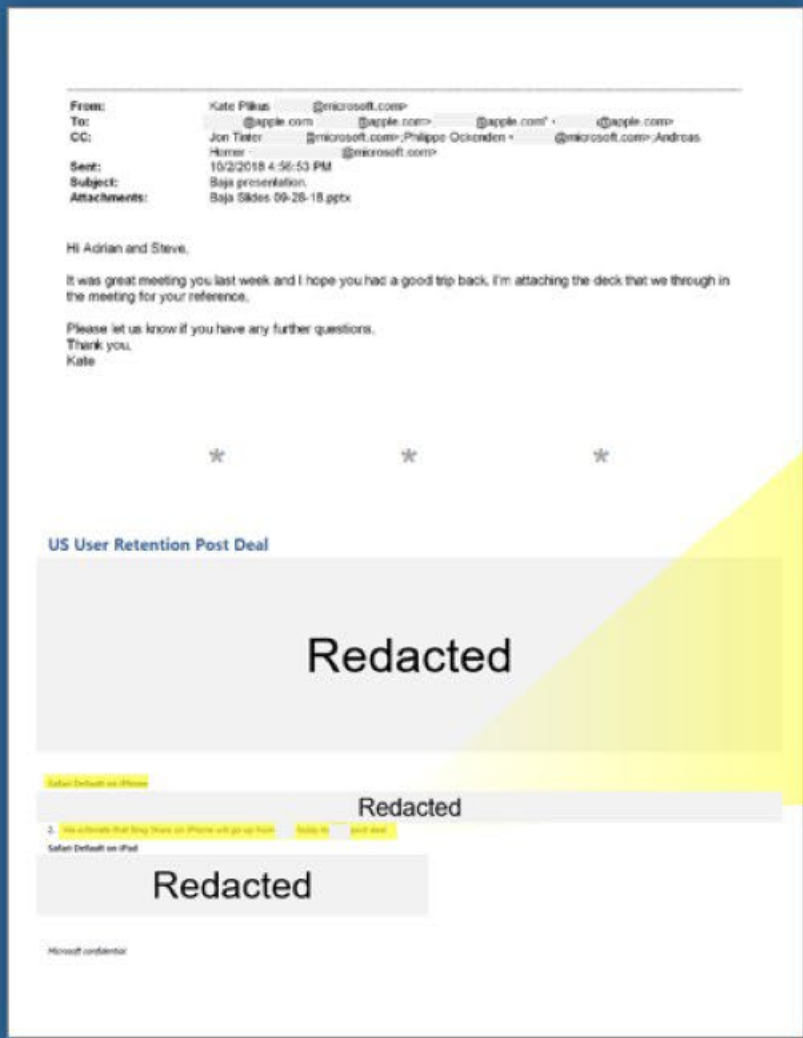
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2016

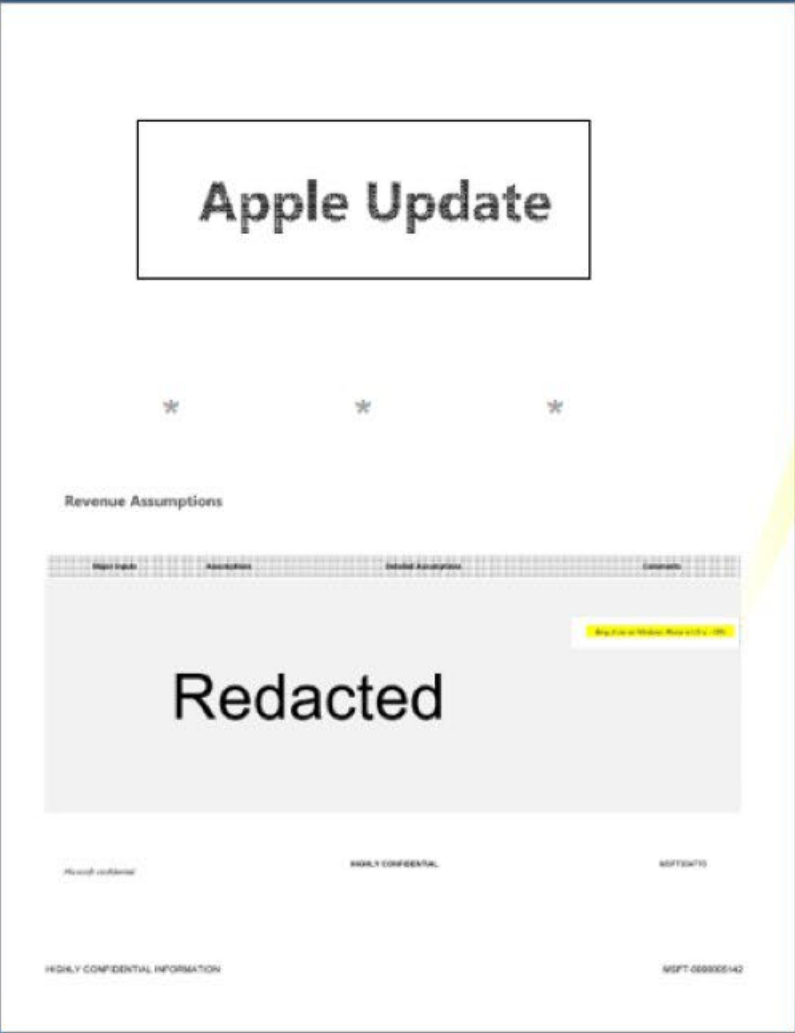
Microsoft also estimated that Google would lose significant traffic without the Safari default



Safari Default on iPhone . . .
We estimate that Bing Share on iPhone will go up from [Redacted] today to [Redacted] post deal

2018

Microsoft based its mobile estimate on Bing's share on Windows Phones



Bing share on Windows Phone in US is **~78%**.

2016

Trial Testimony



Jon Tinter
Corporate VP of Business Development

- Q. And **is the 78 percent share reflected there an accurate reflection of Bing's share on Windows mobile?**
- A. So again, I don't remember. At the point in time, this was a presentation that was made to our CEO, worked on diligently by me, by members of our finance team. **We would have done everything in our power to be as accurate as we possibly could. I was asking the company to make multibillion dollar investments based on it. You do your homework.**
- Q. And that logic would apply to the financial analysis contained in UPX115 more generally?
- A. Yeah. I mean, again, it's sort of **we were asking the company to invest billions of dollars to potentially secure a partnership. You wanted to do the best possible work you can to represent the economics of that.**

Apple also estimated that Google would lose significant traffic without the Safari default

Redacted

Redacted

Bing Scenario

Redacted

- Capture rate established at [Redacted] % of forecast Google Safari queries (i.e., are assuming [Redacted] would change default search engine to Google or migrate to Chrome)
- Consistent with our original modeling test Fall
- Capture Rate is a difficult variable to predict— sensitivities provided in the Appendix 2

Redacted

- Revenue share established as [Redacted]

Comparison

- Assumed [Redacted] "defection" rate for Google post-cancellation

Redacted

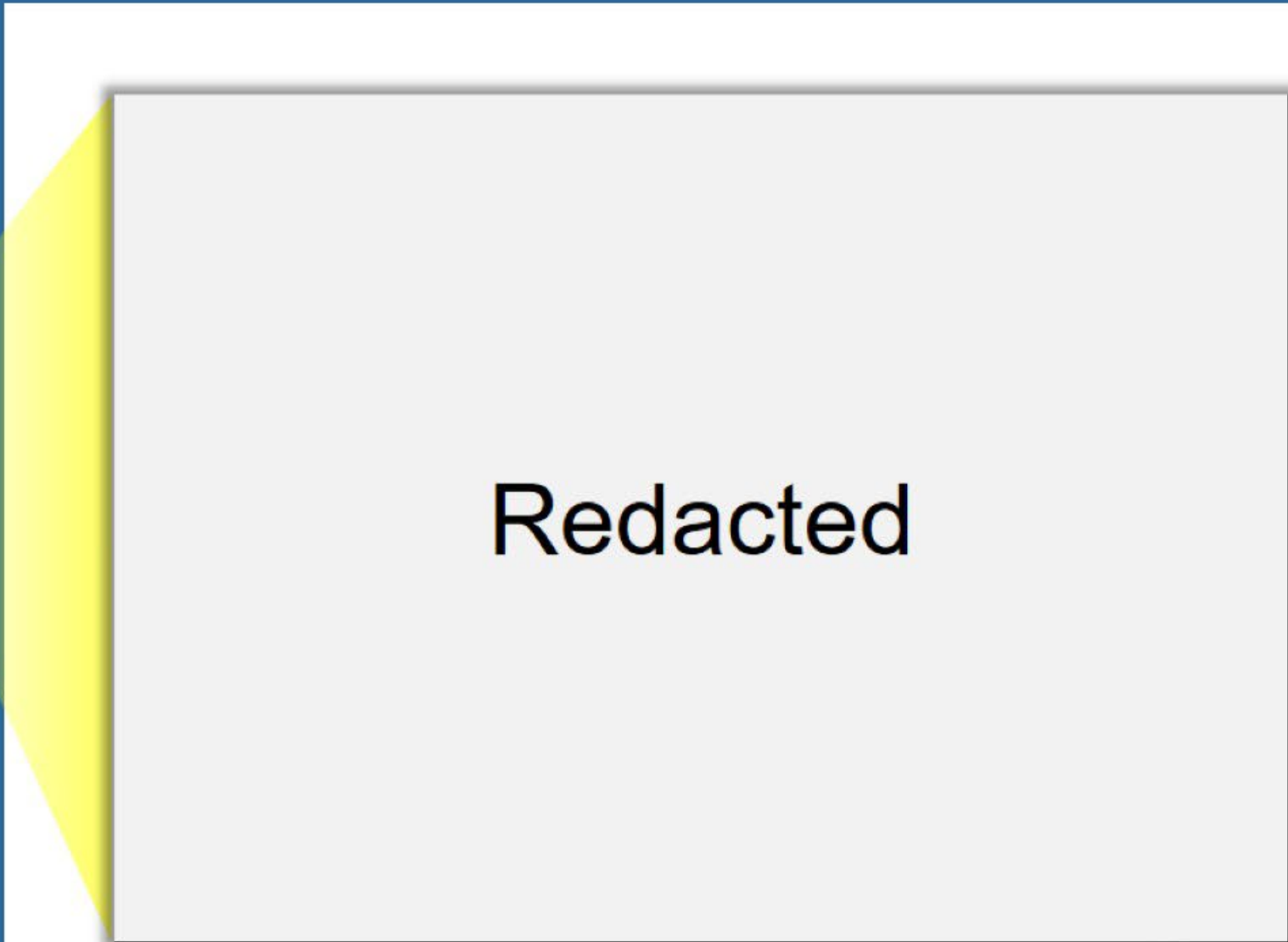
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- Capture rate established at [Redacted] of forecast Google Safari queries (i.e., are assuming [Redacted] would change default search engine to Google or migrate to Chrome)

2016

Google estimated that it would lose significant traffic on Android without the default



2017

- Ordinary course business documents from Google, Microsoft, and Apple estimating the impact of Google losing search defaults
- **Google's payments to search distribution partners**

Google's US RSA payments for exclusive defaults are enormous

Google payments under RSAs by partner type, Redacted (US)

Apple MNOs & Android OEMs Browsers



- In FY2020, Google's total worldwide payments to Apple were Redacted of Apple's total operating income
- Google also gives away the "must-have" Play Store on Android for free

Google queries by access point data (DOJ RFP 2.10); Google RSA data (DOJ RFP 2.66); (Whinston Reply Report, Fig. 88, at D-2); Testimony of Eduardo Cue (Apple), Sept. 26, 2023, 2485:12-14, 2492:3-8.

The percentage of Google's default revenue that it loses by losing its exclusive default is at least Google's revenue share percentages

If Google's distribution agreements are profitable for Google, then:

- **Apple:** Loss of the Safari exclusive default would cause Google to lose at least Redacted of its Safari default traffic revenue

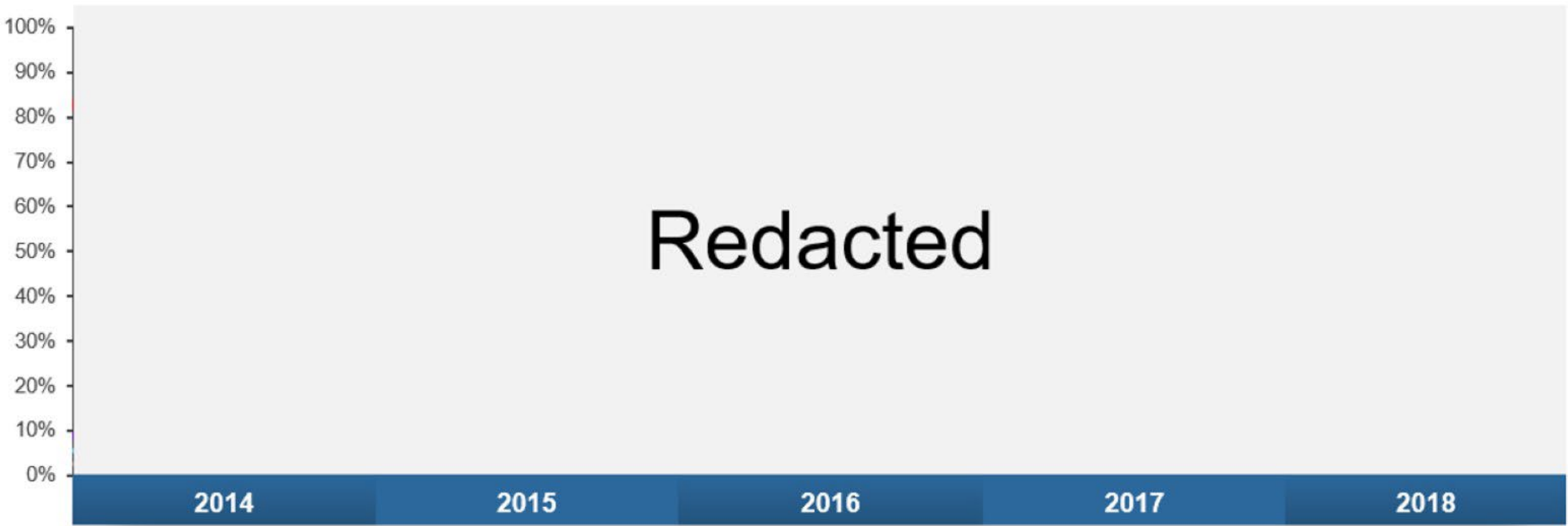
- 2014 Mozilla Firefox search default switch
- EU and Russia choice screens
- Google's and Bing's relative shares by browser

- 2014 Mozilla Firefox search default switch
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Changes in the Firefox default had significant effects on search traffic

General Search Engine Shares Tracked in Google DisplayNav Data On Firefox, PC (US)

Google yahoo! Bing Other



- In 2014, on PCs, Google lost [Redacted] of its overall Firefox traffic, and approximately [Redacted] of its default traffic

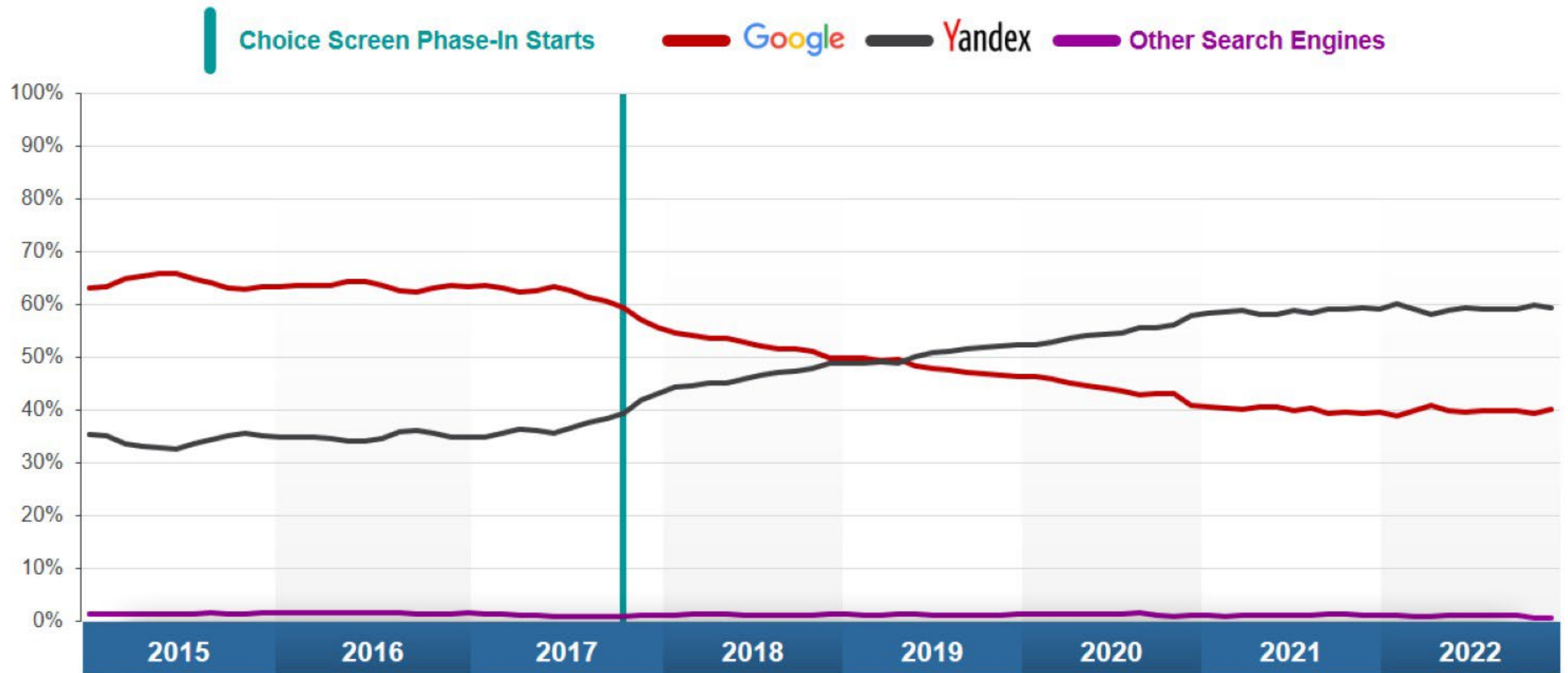
- 2014 Mozilla Firefox search default switch
- EU and Russia choice screens
- Google's and Bing's relative shares by browser

EU choice screen shares in a country depended on the strength of rivals

Country	Google's Share of Choice Screen Selections	Google's Mobile Phone Share	Country	Google's Share of Choice Screen Selections	Google's Mobile Phone Share
Austria	Redacted	98.8%	Liechtenstein	Redacted	98.6%
Belgium		99.2%	Lithuania		99.1%
Bulgaria		99.6%	Luxembourg		97.9%
Croatia		99.3%	Malta		98.7%
Cyprus		98.9%	Netherlands		98.6%
Czech Republic		87.7%	Norway		98.1%
Denmark		98.5%	Poland		99.8%
Estonia		98.7%	Portugal		99.3%
Finland		99.1%	Romania		99.4%
France		97.8%	Slovakia		99.3%
Germany		98.5%	Slovenia		99.5%
Greece		99.5%	Spain		99.1%
Hungary		98.9%	Sweden		98.3%
Iceland		98.3%	Switzerland		98.2%
Ireland		98.9%	United Kingdom		97.6%
Italy		98.7%	United States (2018)		93.5%
Latvia		98.5%	United States (2021)		94.2%

Introduction of the choice screen in Russia changed search shares significantly

Search session shares in Russia for Android mobile phones



The change in Android traffic shares was due to the introduction of the choice screen

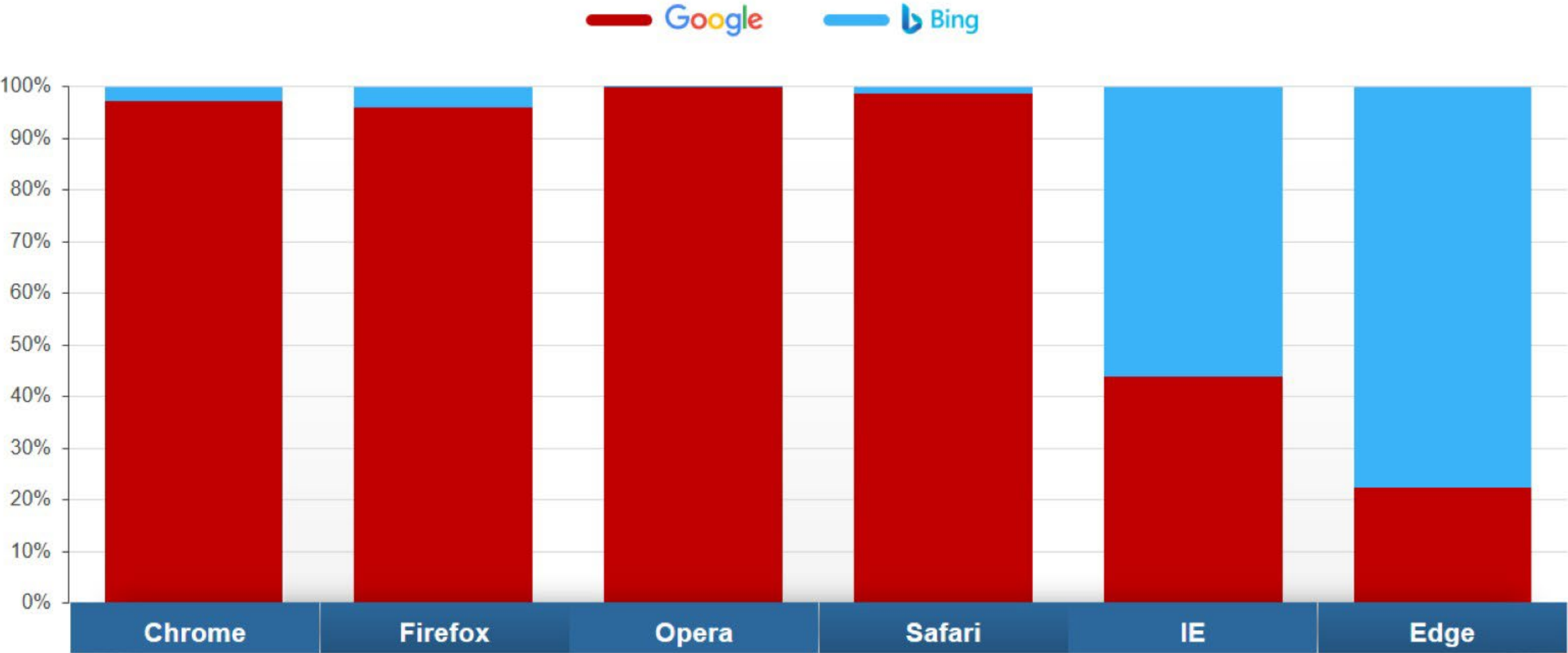
Google search session shares in Russia on Android, iOS, and PC devices



- 2014 Mozilla Firefox search default switch
- EU and Russia choice screens
- **Google's and Bing's relative shares by browser**

Browser defaults drive search engine traffic shares

Google and Bing Relative Shares by Browser, 2021 (US)



Google's default advantages are evident in its shares on Windows vs. Macs

Operating system	Google share	Bing share	Others share
Windows PCs	76%	18%	6%
MacOS PCs	92%	2%	6%

Notes: Shares are for the US in 2021.

- Google has a roughly 16 percentage point higher share on Macs than on Windows PCs
- A shift from Google's MacOS default to Bing's Windows default results in 46% of Google's default queries on MacOS going to Bing

Exclusive defaults shift search traffic substantially

- If all of Google's defaults were shifted to rivals, rivals would gain **33% of US queries**
 - If all of Google's mobile defaults were shifted to rivals, rivals would gain Redacted **of US mobile queries**
- This 33% shift in queries would more than quadruple rivals' total US market share

Opinion 4

Google's search distribution contracts foreclose rivals from a substantial share of each relevant market

Foreclosure is measured by looking at the percentage of the market that is “tied up” by the exclusive dealing contract, and thus by considering how much of the market is available to rival sellers.

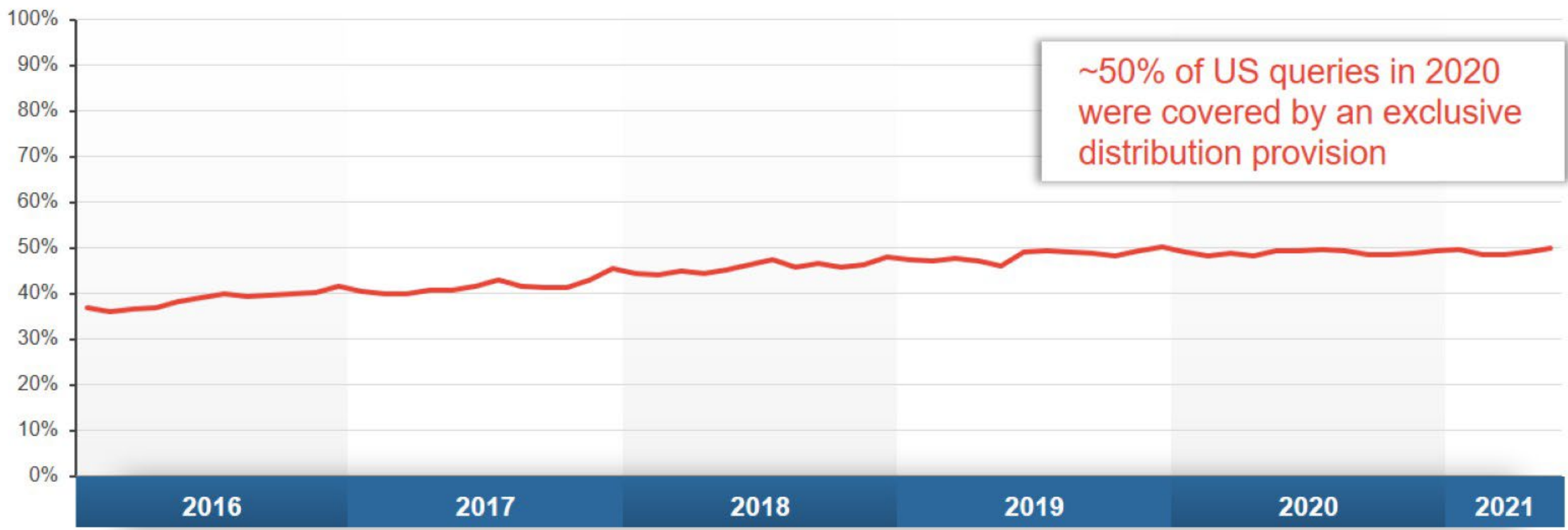
Phillip E. Areeda & Herbert Hovenkamp, *Antitrust Law: An Analysis of Antitrust Principles and Their Application* ¶ 768b4 n.38 (2021).

- Share of US queries covered by Google's exclusive defaults = **50%**
- Share of US queries that Google's exclusive defaults make unavailable even to a much stronger rival = **33%**

Google's exclusive defaults cover 50% of US queries

Share of total queries covered by Google paid distribution contracts (US)

— Queries Covered by an Exclusive Distribution Provision



~50% of US queries in 2020 were covered by an exclusive distribution provision

Covered queries exclude iGSA, Safari bookmarks, and direct navigation

Google's exclusive defaults cover 50% of US queries

Apple	Android	3P Browsers	Total
	Redacted		49.7%

StatCounter Global Stats; Google RSA data (DOJ RFP 2.66); Google QueryNav data (DOJ RFP 2.70); Google queries by access point data (DOJ RFP 2.10); (Whinston Report, Figs. 160 & 161, at 362 & 364; Whinston Reply Report, Fig. 104, at D-16).

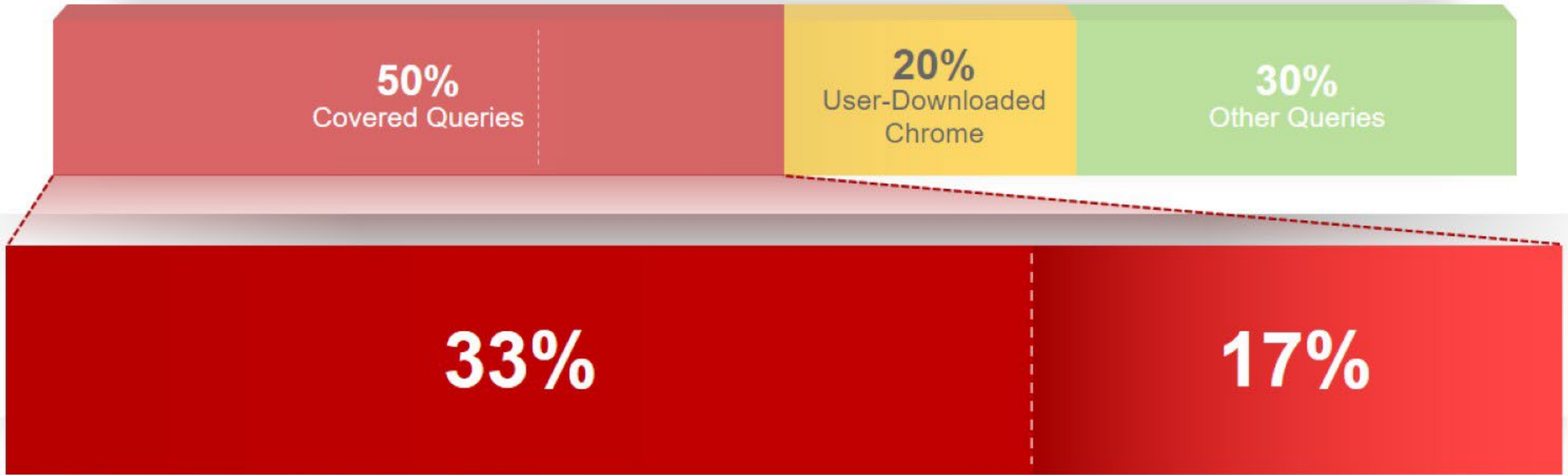
Google's exclusive defaults foreclose 33-50% of US queries

All U.S. Queries



33% of all US queries follow the default

All U.S. Queries



A ***much weaker*** rival with the default gets these queries

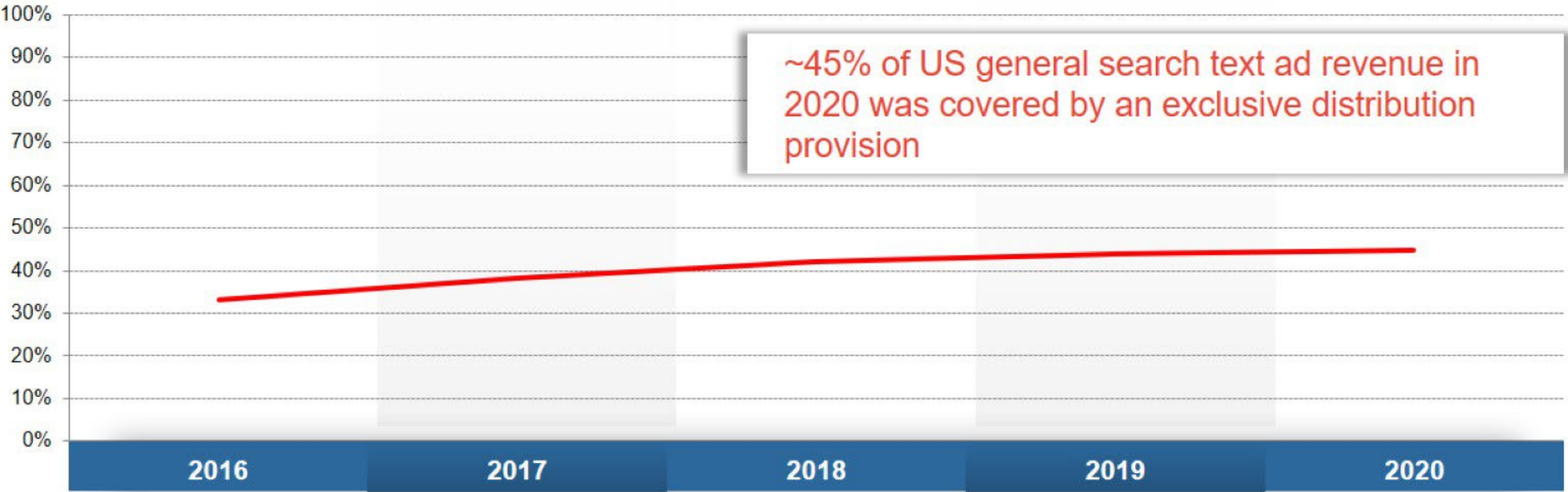
A ***much stronger*** rival without the default gets these queries

StatCounter Global Stats; Google RSA data (DOJ RFP 2.66); Google QueryNav data (DOJ RFP 2.70); Google queries by access point data (DOJ RFP 2.10); (Whinston Reply Report, Fig. 100, at D-12; Whinston Reply Report, Fig. 105, at D-16).

Google's exclusive defaults cover 45% of US general search text ad revenue

Share of total general search text ad revenue covered by Google's exclusive distribution provisions (US)

— General Search Text Ad Revenue Covered by an Exclusive Distribution Provision



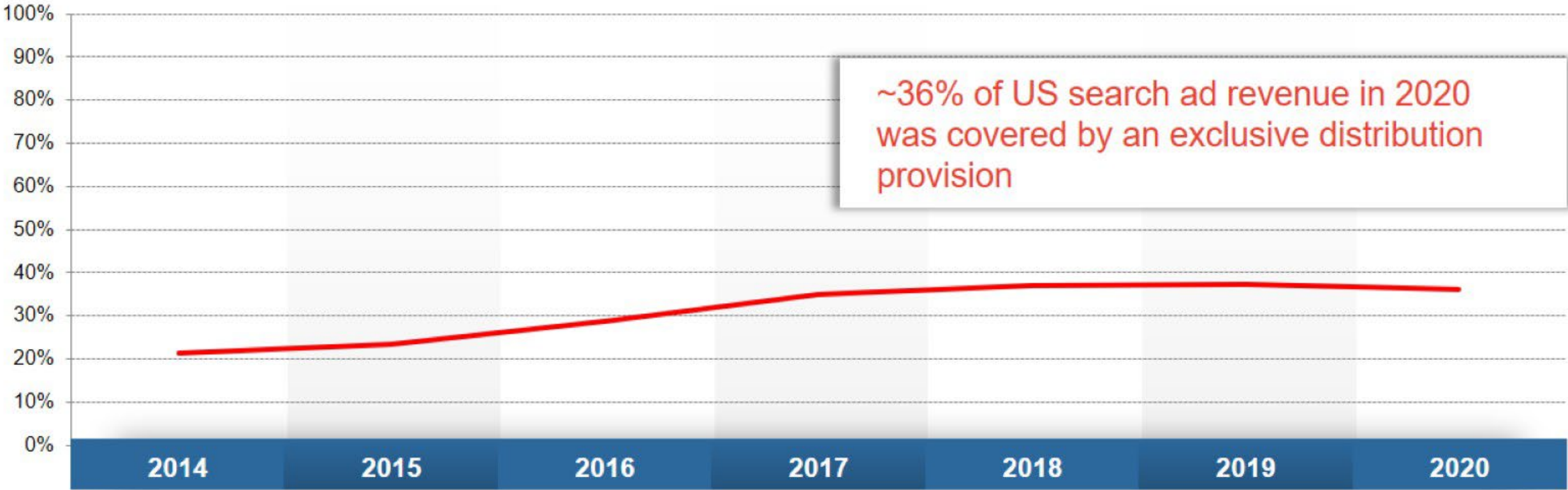
Covered revenue excludes iGSA, Safari bookmarks, and direct navigation

Google RSA data (DOJ RFP 2.66); Google QueryNav data (DOJ RFP 2.70); StatCounter Global Stats; Microsoft aggregate search statistics data (DOJ RFP 1.39); Google queries by access point data (DOJ RFP 2.10); (Whinston Reply Report, Fig. 103, at D-15).

Google's exclusive defaults cover 36% of US search ad revenue

Share of total search ad revenue covered by Google's exclusive distribution provisions (US)

Search Ad Revenue Covered by an Exclusive Distribution Provision



Covered revenue excludes iGSA, Safari bookmarks, and direct navigation

Google RSA data (DOJ RFP 2.66); Google QueryNav data (DOJ RFP 2.70); Google Industry Metrics data (DOJ RFP 8.7); Google queries by access point data (DOJ RFP 2.10); (Whinston Reply Report, Fig. 102, at D-14).

Opinion 5

Google's search distribution contracts have harmed competition to the likely detriment of consumers and advertisers

1. **Reduced scale directly reduces the quality of search engine rivals**, weakening them as competitors
2. **Reduced incentives to compete on quality and price** for Google, current search engine rivals, potential entrants, and distributors

- Ordinary course of business documents and testimony
- Empirical work using data provided by Google and Bing
- Significant business decisions predicated on scale

Google has a large advantage in the number of search phrases it sees

Google and Bing distribution of unique search phrases, February 10–16, 2020 (US)

— Google — Bing — Google & Bing

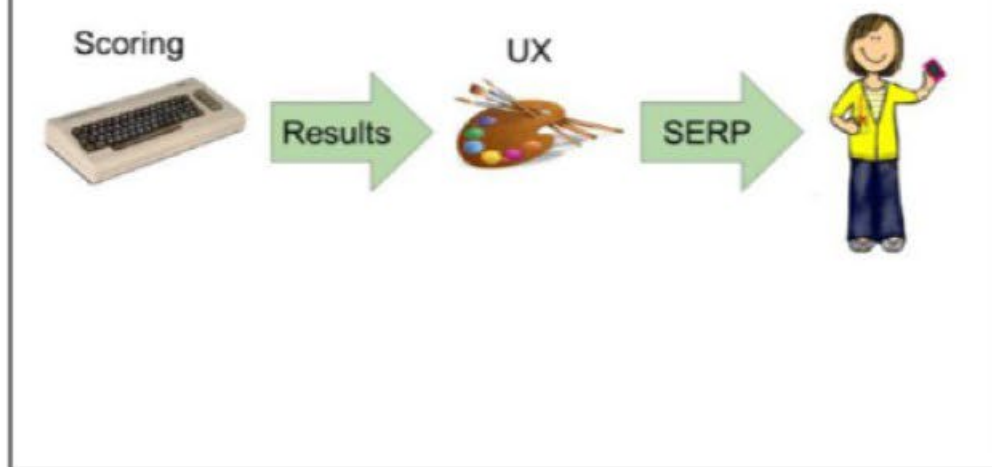
Redacted

- Among query phrases seen between 1–4 times on Google, Redacted are not seen at all on Bing
- About Redacted of all queries are phrases that **only** Google sees

Notes: All devices includes PCs, mobile phones and tablets. Excludes query observations where the search phrase is unknown/missing (for Google, Redacted queries on PC, Redacted on mobile and Redacted on tablet).

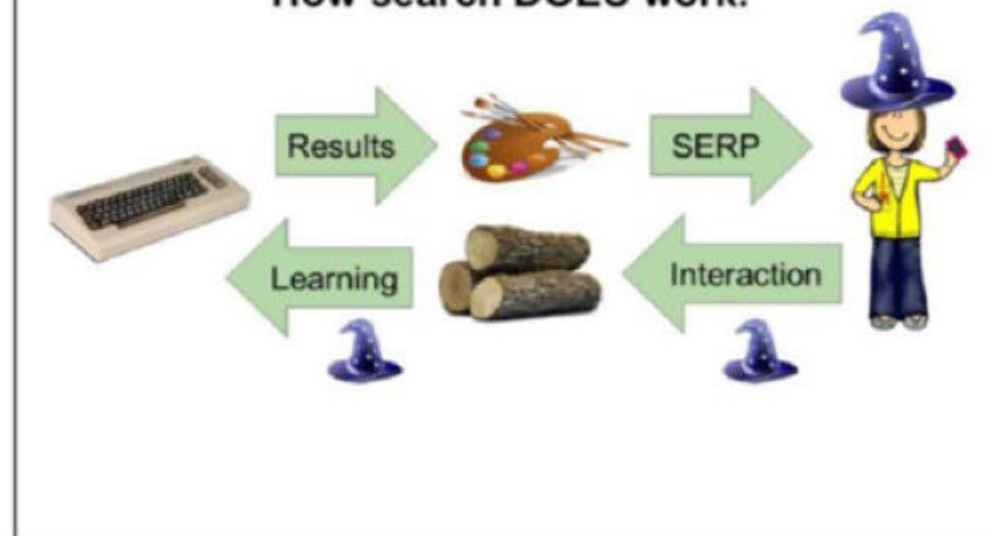
User interaction data is the source of Google's "magic"

This is NOT how search works.



Let's start with how search does NOT work. We get a query. Various scoring systems emit data, we slap on a UX, and ship it to the user. This is not false, just incomplete. So incomplete that a search engine built this way won't work very well. No magic.

How search DOES work.



The key is that there is a second flow of information in the reverse direction. As people interact with the search results page, their actions teach us about the world. For example, a click here means the image was better than the web result. A long look there means the KP was interesting. We logs these actions, and then scoring teams learn from them.

2017

Google recognizes the importance of scale

On Fri, Aug 21, 2009 at 7:24 AM, Adam Kovacevich <@google.com> wrote:

Redacted

From: Rachel Whetstone <@google.com>
To: David Wagner <@google.com>, Adam Kovacevich <@google.com>
Sent: Fri Aug 21 05:02:44 2009
Subject: Fwd: Time Mag article on Bing

Redacted

Thanks Rachel

----- Forwarded message -----
From: Rachel Whetstone <@google.com>
Date: Fri, Aug 21, 2009 at 2:01 AM
Subject: Re: Time Mag article on Bing
To: Marissa Mayer <@google.com>
Cc: Udi Manber <@google.com>
<@google.com>

Thanks Udi and Marissa-- Adam
our scale arguments written...

Rachel

On Thu, Aug 20, 2009 at 5:53 PM
The key issue here as I see it is a
check, the best personalized search
learning as well as the size/scale

Also, saying the quality/quantity
doesn't matter nor does high qua

Udi may have other issues, but i

On Thu, Aug 20, 2009 at 2:39 PM
Congratulations, very nice article
wrong. I know it reads well, be

-- Udi

On Thu, Aug 20, 2009 at 1:24
Udi and Marissa,

Do you think that Yahoo, Naver and Baidu all have better search in their languages than we do? My understanding was that there were other reasons for their relative success--e.g. music downloads, gaming fees, local heroes, etc.

My understanding is that Microsoft is not doing the search deal with Yahoo in order to get more data to improve their search but rather to get more advertisers on Bing. My guess is that can and will improve Bing over the next several months even without having significantly more queries.

However, you have convinced me that I should tone down these arguments, particularly about the search side which I know little about. (This is fine, since Microsoft's main arguments have to do with the monetization side anyway.)

Here is what I say on a slide, would you disagree with any of this? If you have 20 minutes, I will run the entire presentation by you for comments/critiques.

Of course, more data is valuable
but there are diminishing returns to data
value of incremental data decreases as amount of data increases

Other important factors:
engineering and analytic attention
infrastructure to manage data
skills to manage data
judgment in prioritizing choices

On Tue, Aug 25, 2009 at 7:55 PM, Udi Manber <@google.com> wrote:
Yahoo, Naver, and Baidu all have better scale than we do in their languages. And Yahoo search now is better than Google search was in Jan 2007. And although it's true that "Google seemed to do a pretty good job when we had half as many queries per day as we do now," we are doing much better now that we have more queries. So all those 3 arguments do not hold water. Saying that an effect is "bigger" because it is not linear or because it is not the only existing factor is misleading. Which is why Times didn't understand it and I suspect others will not either. What they got out of it is "Microsoft's claim that they need more scale in search to improve their algorithm is bogus". And this is wrong. That's all I am saying.

-- Udi

On Tue, Aug 25, 2009 at 7:37 PM, Hal Varian <@google.com> wrote:

On Tue, Aug 25, 2009 at 6:41 PM, Udi Manber <@google.com> wrote:
The bottom line is this. If Microsoft had the same traffic we have their quality will improve *significantly*, and if we had the same traffic they have, ours will drop significantly. That's a fact.

No one is disputing that point. After all, we are talking about 10 times more data, so of course their quality will improve significantly. My claim is that it won't be 10 times better.

Is it the only factor? Of course not. Nothing is. Do we have other advantages? Of course we do. Is it very significant? Yes. What Ballmer said is probably true (comparing search quality to OS, Office, and gaming where good engineering is much more important than user feedback).

3

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Marissa Mayer (Discussing Hal Varian's Remarks)



The key issue here as I see it is that you do get better as you have more users - that's why we have the best spell check, the best personalized search, the best refinements, etc. Most people who understand AI or machine learning as well as the size/scale of data would question his assertion/know that it's unlikely.

Udi Manber (In Email Exchange with Hal Varian)



The bottom line is this. If Microsoft had the same traffic we have their quality will improve *significantly*, and if we had the same traffic they have, ours will drop significantly. That's a fact.

2009

Scale impacts a general search engine's quality

Trial Testimony



Microsoft

Mikhail Parakhin

CEO of Advertising & Web Services Business

A. ... if you have slightly more users using your search engine in specific geographic area and specific form factor, then **you will have more clicks and more user behavior. Those things very directly influence search quality.** Simply if you've seen – if this query was issued previously and people already clicked on certain results and read them, and some results they click-click-click back, it gives you a lot of information which results are actually good or not, and you can memorize them

Trial Testimony



Eric Lehman

Software Engineer

Q. So having more user data helps Google figure out what results might be more relevant; right?

A. **So having user data is useful to Google in identifying relevant results for a search query.**

2018 Email UPX0266



John Giannandrea

Apple SVP of Machine Learning and AI Strategy; Former Google Head of Search and Artificial Intelligence

If you show the right answer at position @3 and people click on it more than @1 then you know that you should be ranking it higher and you can learn from this. [It's] machine learning a ranking signal by raw counting clicks!

Google's NavBoost relies on user data to provide high-quality search results

2016 Outline of Rankings Newsletters



Eric Lehman
Software Engineer

Exploiting user feedback, principally clicks, has been the major theme of ranking work for the past decade.... **Navboost is the original click exploitation system and still the most potent.**

Trial Testimony



Eric Lehman
Software Engineer

Q. Navboost trains on about Redacted
of user data; right?

A. That is my understanding.

* * *

A. ...We need to learn from our users in the form of Clicks.

2006 Google "Founders Award" nomination submission...



Amit Singhal
SVP of Software Engineering

The more traffic we get, the better will be our search.... **In some sense, Navboost has locked out small players from the ranking game.**

Scale improves a search engine's ability to conduct live-traffic experiments

Trial Testimony



Microsoft **Jon Tinter**
Corporate VP of Business Development

- A.** . . . **The great thing about improved scale is you have the capability now to run more simultaneous experiments.** If the minimum size of an experiment is 2 and you have 100, then you can run 50 experiments. If the minimum size of an experiment is 2 and you have 1,000, then you can run 500 experiments. Right? And so **one of the reasons we were so excited about getting access to query volume at Apple's scale was you could run more simultaneous experiments.** You still need engineers to write the code, build the experiments, generate the experiments, and realize them and use them to improve the product. . . .

Trial Testimony



Microsoft **Mikhail Parakhin**
CEO of Advertising & Web Services Business

- Q.** Now focusing on the United States, does Bing have sufficient scale to run search quality experiments?
- A.** I think on desktop in United States, we are not really constrained by amount of traffic we get to run experiments. **On mobile, we are constrained simply because we have fewer overall mobile users. So, roughly speaking, we cannot run more than, I want to say, about 20 to 30 experiments at the same time on mobile where on desktop we run thousands of experiments at the same time.**

Trial Testimony

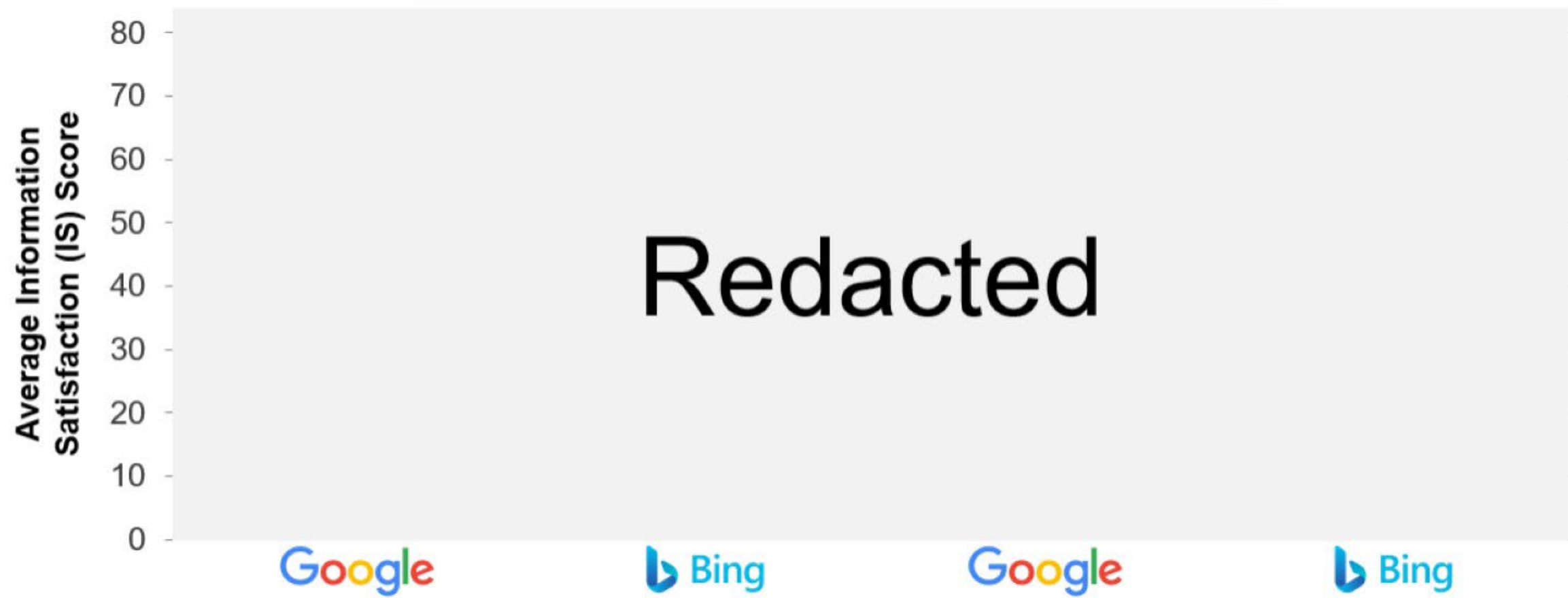


Gabriel Weinberg
CEO & Founder

- Q.** And would additional searches have allowed DuckDuckGo to better compete with Google in the search market?
- A.** . . . As I mentioned to the question on experimentation, **we lack the scale to do as much experimentation as we want,** especially for all these different search modules which are only a small portion of the query space, is what we would call it. So more searches always yields better relevancy over time.

Google and Bing have higher quality for more frequently seen queries and Google is much better than Bing on tail queries

Average Google and Bing information satisfaction (IS) scores for popular and tail queries by month, July 2020 to September 2021 (US)



Notes: "Tail" queries are defined as the least frequently searched among the randomly selected queries, while "popular" queries are the most frequently searched among the randomly selected queries (Letter from Franklin M. Rubinstein to Alex Cohen, October 29, 2021).

Mobile queries are different than desktop



**Pandu
Nayak**
VP Search



- A. So we have done some studies on how users behave on mobile phones versus desktop. **There are some, sort of, striking difference[s] that come up.**

One is mobile queries tend to be more local, more local seeking, both in terms of the distribution of queries . . . [and] [t]he intent is also more local. A good example of that is if you search for, let's say Bank of America on your mobile phone. Chances are you are looking either for a location of the closest bank or maybe an ATM for the bank. But if you search for Bank of America on your desktop, chances are you want to do online banking, right. So local -- the local intent is stronger on mobile. Desktop, on the other hand, tends to have a stronger research intent, right.

Scale on mobile uniquely affects a search engine's competitiveness for mobile queries

Redacted

Redacted

On Dec 12, 2018, at 10:19 PM, John Giannandrea <Redacted@apple.com> wrote:

All good questions. Siri doesn't compete directly against Google search. It competes against Alexa and Google Assistant. The query mix is very different. It's more "sent a message to Adrian" than it is "how do I prune an Apple tree". There is overlap and Google's strength in answering questions puts us at a disadvantage.

Redacted

I don't think Bing can do better than Google search for the search use case unless it spends more on it or has a better moat. Not having mobile queries at scale is a huge liability for them since the most important search signal is engagement. But it is not impossible. As we noted yesterday the reason a better search engine has not appeared is that it's not a VC fundable proposition even though it's a lucrative business.

Can I imagine that Apple can build a search engine to compete. Yes but it's probably not the best way to differentiate our products.

JB

On Dec 12, 2018, at 5:36 AM, Adrian Perica <Redacted@apple.com> wrote:

John,

I was reflecting on yesterday's discussions and got myself tripped up trying to think through the below logic. If you have moment to ponder it, here goes:

If Apple believes that Bing can't compete with Google since Bing has... answers vs. Google's... answers, then how does Siri compete with Google? I assume the answer is...

Redacted

But if the above assumption is true for Siri, then wouldn't Bing's path to success just be a parallel effort of more concentrated Siri efforts against Google? That is, many small teams working on specific parts of the query-hand, term, and list algorithms to directly compete against Google? Bing would need to invest in a large index, but it seems that Google's path to success has also been by investing heavily in answers to which many of the clickstream optimizations. Siri's software engineering "by the way" as you've described before.

I'm trying to push on how much data we have that objectively shows Bing is worse in areas where they've made an effort against Google, vs. the perception that Bing must be worse because Google is insurmountable in this category.

Thanks,

Not having mobile queries at scale is a huge liability for [Bing] since the most important search signal is engagement. But it is not impossible.

John Giannandrea, Senior Vice President of Machine Learning and AI Strategy



Former Google Head of Search and Artificial Intelligence



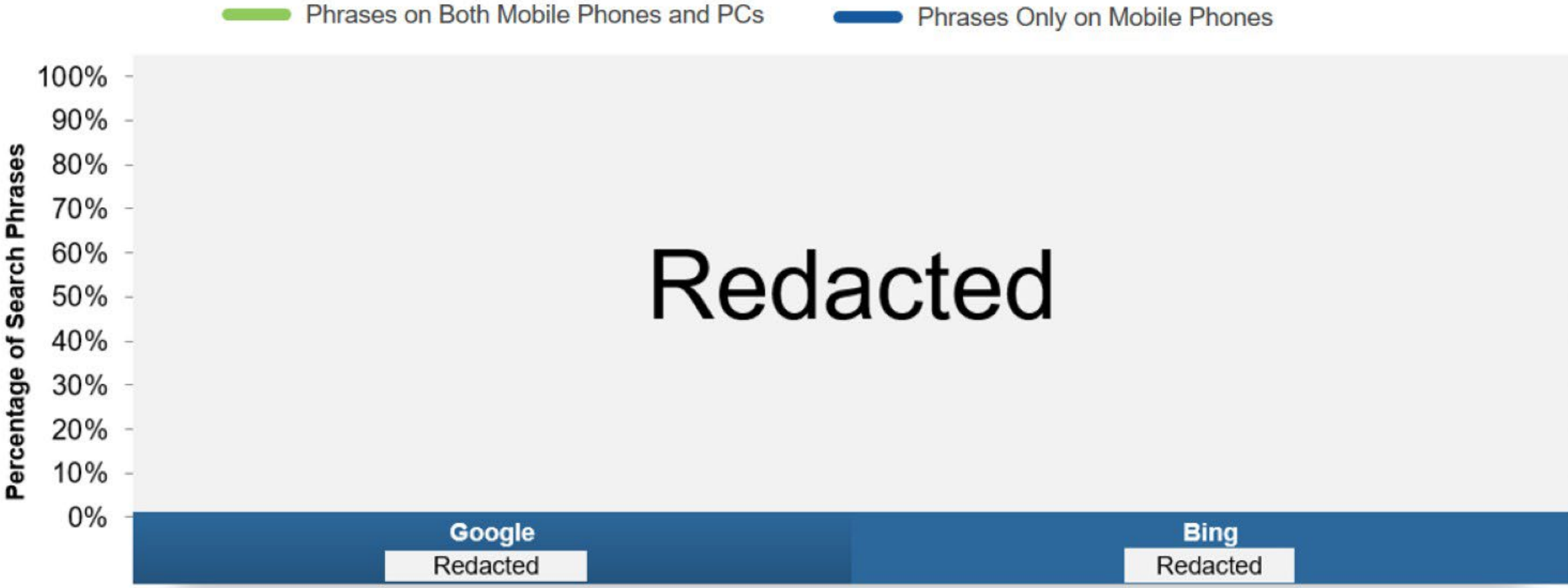
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2018

Mobile query phrases are often not seen on PCs

Google and Bing distribution of unique search phrases on mobile phones, February 3–9, 2020 (US)



- More than [redacted] of Google’s “near me” queries appeared on mobile phones.

Notes: Excludes query observations where the search phrase is unknown/missing.

Microsoft has made significant business decisions predicated on scale

Trial Testimony

 **Microsoft** **Satya Nadella**
CEO

Q. And what was thesis for Microsoft's perspective about – relating to entry into [the Yahoo!] deal?



A. At that time, that was the big break-through we needed. In fact, **I don't think we would be here, quite frankly, even in desktop competing if it was not for the Yahoo! deal, giving us enough of a market position.** Again, thanks to, in fact, the intervention, I forget now which, by the DOJ, I think, which helped us, in fact, because they were going to go to Google, because they were going to get marginally better economics than we could ever give them. But since, for some reason, at least at that time, people said, oh, you can go to high share player, **that helped us a ton to get to some credible share position and the auction density improved and obviously Yahoo! benefited from it, we benefited from it.** So, yes, that was a very helpful thing for us.

Trial Testimony

 **Microsoft** **Jon Tinter**
Corporate VP of Business Development

Q. Is scale something that you think about when negotiating search distribution deals?

A. Absolutely. I think it's -- you know, if you ask the question at the most basic level, why do we do it, right, **why does my team exist in the context of our search business, it is about how do we think about scale.** . . .

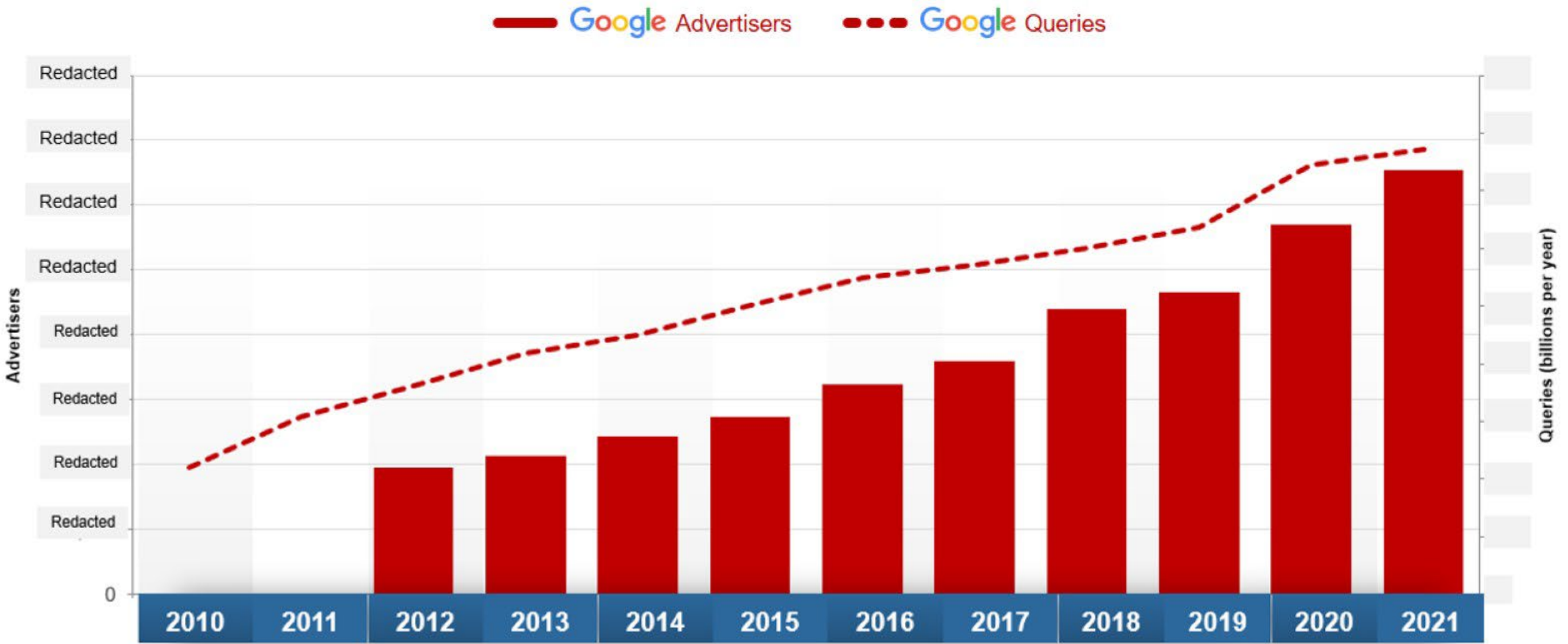
  **2016**
Microsoft document sent to Apple during deal negotiations

This document explains the economic model built by the Microsoft team to model the impact of increased scale in the Bing Ads marketplace from a **search partnership with Apple.** . . . **Scale is crucial for delivering superior end user experience, publisher revenue, and advertiser ROI.**

- Scale drives advertiser participation on a general search engine's platform
- Scale improves a general search engine's ability to show relevant ads and increase ad click-through rates

The number of advertisers on Google has grown with the number of queries

Number of queries and number of advertisers on Google, 2010–2021 (US)



Google customer spend data (DOJ RFP 2.76); Google QueryNav data (DOJ RFP 2.70); (Whinston Report, Fig. 191, at 435).

Scholarly Article by 16 Google Employees Titled “Ad Click Prediction: A View from the Trenches,” 2013

“It is necessary to make predictions many billions of times per day and to quickly update the model as new clicks and non-clicks are observed. Of course, this data rate means that **training data sets are enormous.**”

“[S]mall improvements can have meaningful impact at scale and need large amounts of data to be observed with high confidence.”

2013

Click-through rates are higher for more frequently seen queries

Google and Bing Impression-Weighted Average CTR for Top-Slot First-Position Text Ads, by Device, February 10–16, 2020

Google Bing



Number of Queries on Google for a Given Query Phrase (Within Device Type)

Notes: Limited to search phrases that generated at least one top slot text ad on both Google and Bing on the same device type. Query volume (x-axis) measured as total number of Google queries on the device type of interest. Click-through rates (y-axis) are calculated separately by device and are equal to total clicks ÷ total impressions (top-slot first-position text ads only) across all search phrases in each query-volume grouping.

The Microsoft-Yahoo deal significantly improved Bing's monetization

Search Economics Deep dive

9/30/2015



- The first thing to note is that as in any marketplace, scale matters.
- Here we see a scale curve that we used to model the original Yahoo!MS partnership.
- Based on econometric modeling, and empirical evidence
- We started this journey in 2010, where our RPM was around \$10
- We're proud of our trajectory over the last 5 years, both in absolute terms, but more in the constant cadence of growth.
- Verbalize where we think Google is
- Yahoo initial hurdles: import tools, some offerings that we didn't have, platform capabilities that needed to be upgraded

Last 5 years of Search Ad marketplace performance

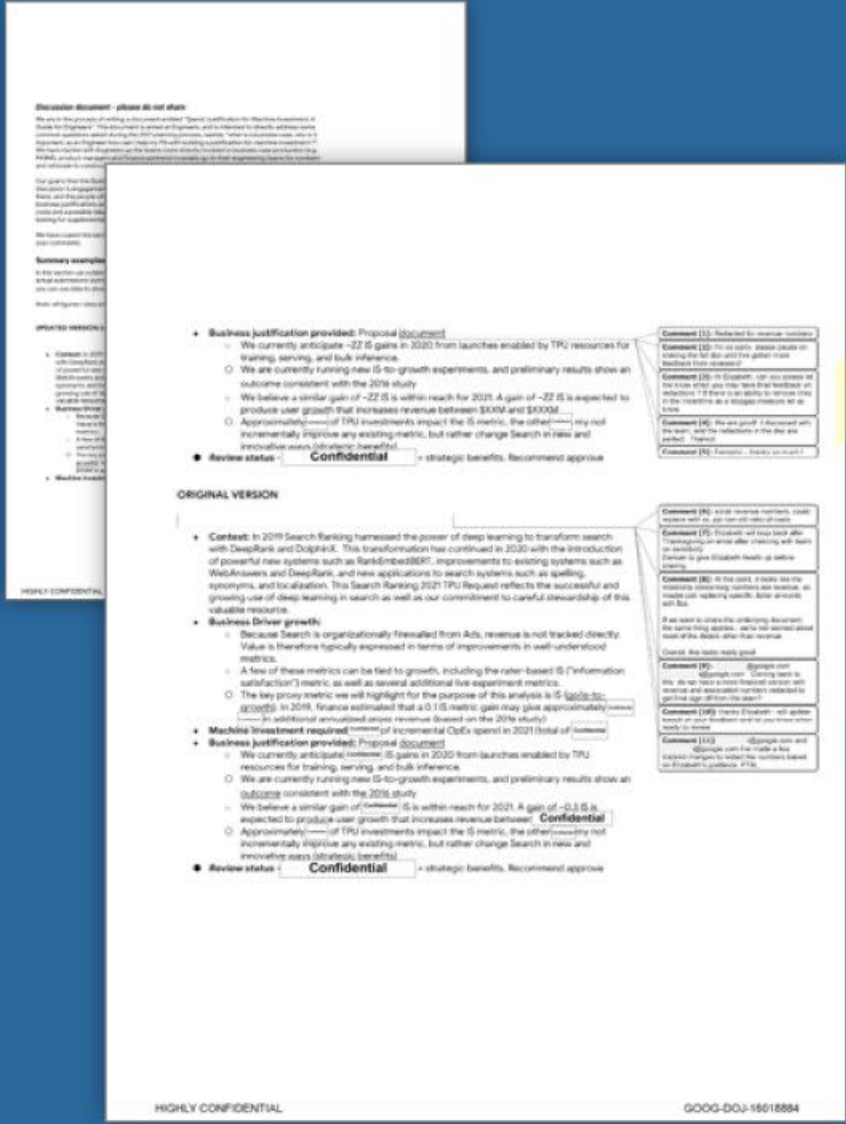


- Curve represents how RPS moves with growth in supply. Supply drives advertiser demand, which drives RPM and improves quality of product, which drives more supply.
- RPM increases with scale as advertisers increase bids to be on top in the auction, and algorithms improve with more data
- Curve is initially steep as small increases in scale meaningfully improve advertiser participation, making it possible to offset fixed cost of investing in another platform
- Product innovation shifts performance to a higher RPM curve, not along the same curve
- Yahoo scale lift broadly matched our expectations in CY12
- Most of subsequent performance improvements come from Innovation and Demand expansion

2015

1. **Reduced scale directly reduces the quality** of search engine rivals, weakening them as competitors
2. **Reduced incentives to compete on quality and price** for Google, current search engine rivals, potential entrants, and distributors

Google uses cost-benefit analysis to evaluate investments in search quality



Business Driver growth:

- The key proxy metric we will highlight for the purpose of this analysis is IS (go/is-to-growth). In 2019, finance estimated that a 0.1 IS metric gain may give approximately Redacted in additional annualized gross revenue (based on the 2016 study).

2020



Mikhail

Parakhin

CEO of Advertising &
Web Services
Business



- Q. And at a high level, what criteria do you consider when making investment decisions for search?
- A. There are multiple criterias to be taken into account. It is -- you know, **fundamentally it boils down to what kind of a long-term revenue we can achieve. . .**

Trial Testimony

Google's contracts reduce rivals' incentives to invest

Trial Testimony

 **Microsoft** **Mikhail Parakhin**
CEO of Advertising & Web Services Business

- Q.** Mr. Parakhin, it is the case that Microsoft told Apple that it could invest more in mobile search but it would not do so unless Apple gave it further distribution in mobile?
- A.** **It is uneconomical for Microsoft right now to invest more in mobile because even -- any -- like, it's our belief that no amount of investment without securing some way to do distribution in mobile will result in any share gain.** And so Microsoft, unless -- it is correct that unless Microsoft gets a more significant or a more firmer guarantee of distribution, then it makes it uneconomical for Microsoft to invest in mobile quality and in mobile search mode.

Deposition Testimony

 **Mark Stein**
EVP & Chief Strategy Officer

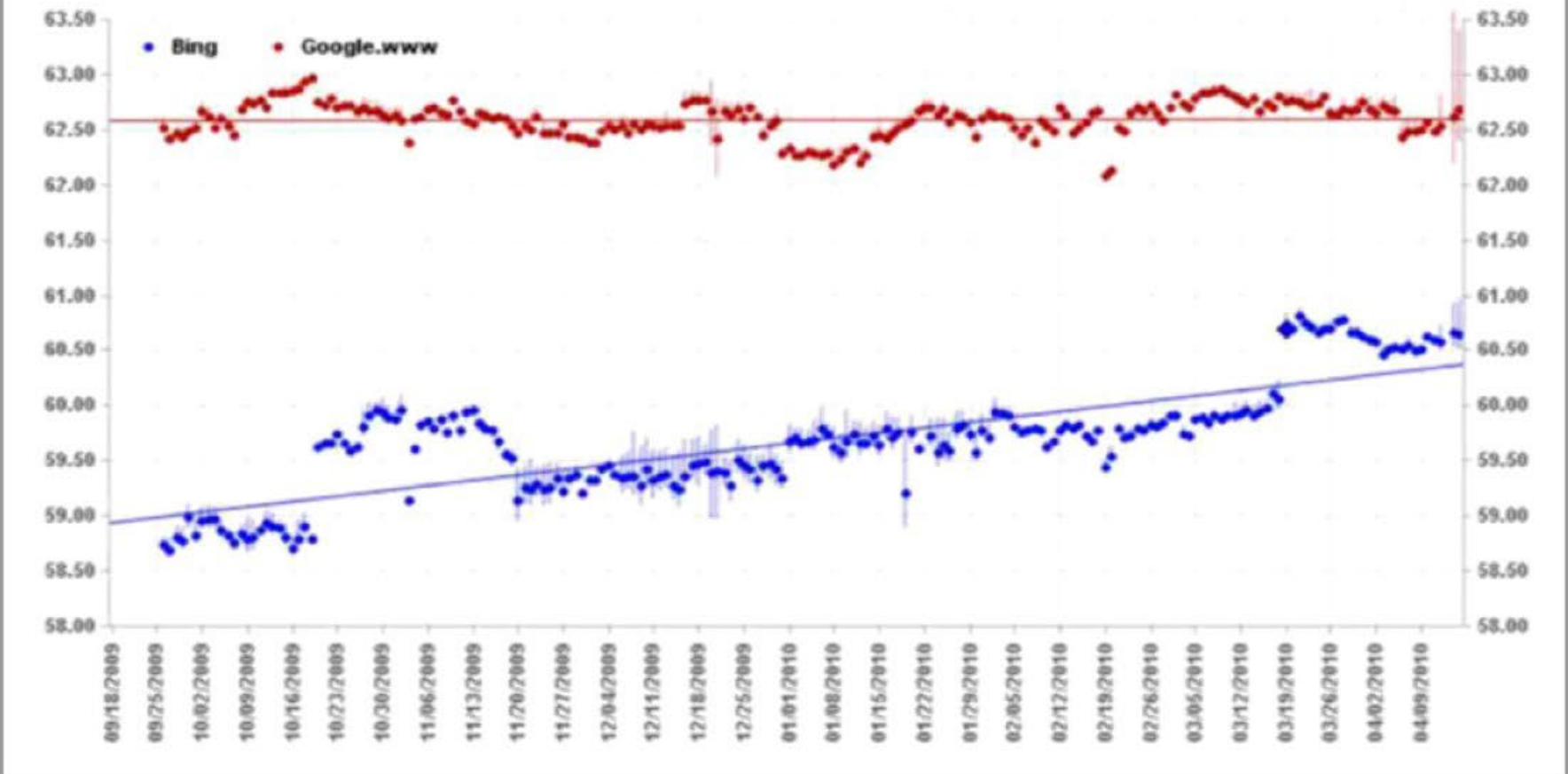
- Q.** **Did Ask's inability to get distribution, was that a factor in its decision to ultimately stop crawling and indexing the web?**
- A.** **Yes**, in the sense that the -- a component of delivering the product is getting enough signal from user -- getting signal and data from user queries is important.

2009 Introduction of Bing

2018 European Commission Ruling
Requiring Choice Screen

Google viewed Bing's rising quality as a competitive threat in 2009-2010

Precision Sep 2009 to Apr 2010



2012

Google declared a “Precision Code Orange” in response to the launch of Bing

From: Amit Singhal <amitsinghal@google.com>
 To: Eric Schmidt, Sergey Brin, Peter Dinklage, Michael C. Jensen, Alexander Chudakov, Steven H. Rosenberg, Alan Emtage, Michael O'Connell, Aron Dabrowski, John Lamping, April Chen, Paul Rast, Parag Mehta, Thomas H. Davenport
 Subject: Re: Precision Code Orange

The plan for tomorrow is to debug in the morning and meet in the early afternoon to plan strategy - location to be determined.

I got the feeling from the call that the approach on your side is to go all-in and debug like crazy.

On Tue, Mar 23, 2010 at 11:00 AM, Amit Singhal <amitsinghal@google.com> wrote:

On Fri, Mar 26, 2010 at 8:49 AM, Amit Singhal <amitsinghal@google.com> wrote:

Alex, Andrei, April, Eric, John, Neesha, Panda, Paul, Steve, Sundeep, Trysian,

As you know, we have a serious competitive threat from Bing in ranking. We need to act fast and act decisively. I would like you to drop everything you are doing starting today and debug the new 20k set for losses to Bing (possibly later). Eric: will coordinate. Tell me what is needed, e.g. do you need a big room or would you like to debug in your offices? Do you want me to free up anyone else? Based on your debugging, we should find obvious low-hanging fruit, i.e. screw-ups in our system that are just annoying. We should also look for other more nuanced failure patterns that can be used for long term improvement.

Let's get started. I am free all afternoon today and will debug things with you.

Regards,
 - Amit

Andrei Lopatenko
 Search Quality
 Google

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GOOG-001-6617371

As you know, we have a serious competitive threat from Bing in ranking. We need to act fast and act decisively. I would like you to drop everything you are doing starting today and debug the new 20k set for losses to Bing

Amit Singhal, former head of Google's search ranking team 

2010



Eric Schmidt
Former CEO




- A. I believe in the subsequent three years, we have responded to their competitiveness with a number of products.** Obviously they did a bunch of stuff in travel; we've done a bunch of stuff in travel. You could argue that we were -- **although our pride would be hurt, you can argue that we were responding to competition that was initiated by Microsoft.** I know that our algorithms have gotten much better. Our index has gotten much larger. . . . **[W]e responded successfully to [the] competitive threat from Microsoft.**

2009 Introduction of Bing

2018 European Commission Ruling
Requiring Choice Screen

Google's "Go Big in Europe" plan led to investments to improve quality



Search Update

PSSR

March 10, 2020

* * *

FUDJE: Continued focus on growing engagement and trust

Category	Item	Timeline
Unique features	Finance enhancements (landing page, stock/mutual fund OSRPs)	Q4
	Health: Conditions, Symptoms, Drugs and Health Explore	Q1
	Language: Pronunciation practice	Q2/3
	TV: Subscriptions & linking	Q2/3
	TV: Episode recaps and analysis	Q3/4
Local content	Weather: Sky conditions based on user reports	Q1
	Sports: Videos for Formula 1	Q1
	Local Events i18n (FR, IT, JP)	TBD
Trust	Job Search: Apprenticeships, internships (DE, FR)	TBD
	EU Search engine choice	Q1
	Default auto-delete for new accounts (at 18 mths)	Q2

Continue to drive on Go Big in Europe pillars

Unique features	● Finance enhancements (landing page, stock/mutual fund OSRPs)	Q4
	● Health: Conditions, Symptoms, Drugs and Health Explore	Q1
	● Language: Pronunciation practice	Q2/3
	● TV: Subscriptions & linking	Q2/3
	● TV: Episode recaps and analysis	Q3/4
Local content	● Weather: Sky conditions based on user reports	Q1 Q1
	● Sports: Videos for Formula 1	Q1
	● Local Events i18n (FR, IT, JP)	TBD
	● Job Search: Apprenticeships, internships (DE, FR)	TBD
Trust	● EU Search engine choice	Q1
	● Default auto-delete for new accounts (at 18 mths)	Q2
	● About This Result	Q2
	● AGA Incognito mode	Q3/4

2020



Ben Gomes
SVP Search &
Assistant



- Q. Do you agree that the impetus for those product changes was the implementation of the European choice screen?
- A. I think this made people think about those countries in a slightly different light, and say, **“Well, is there some way, some other things that we could be doing that we may be missing.”**

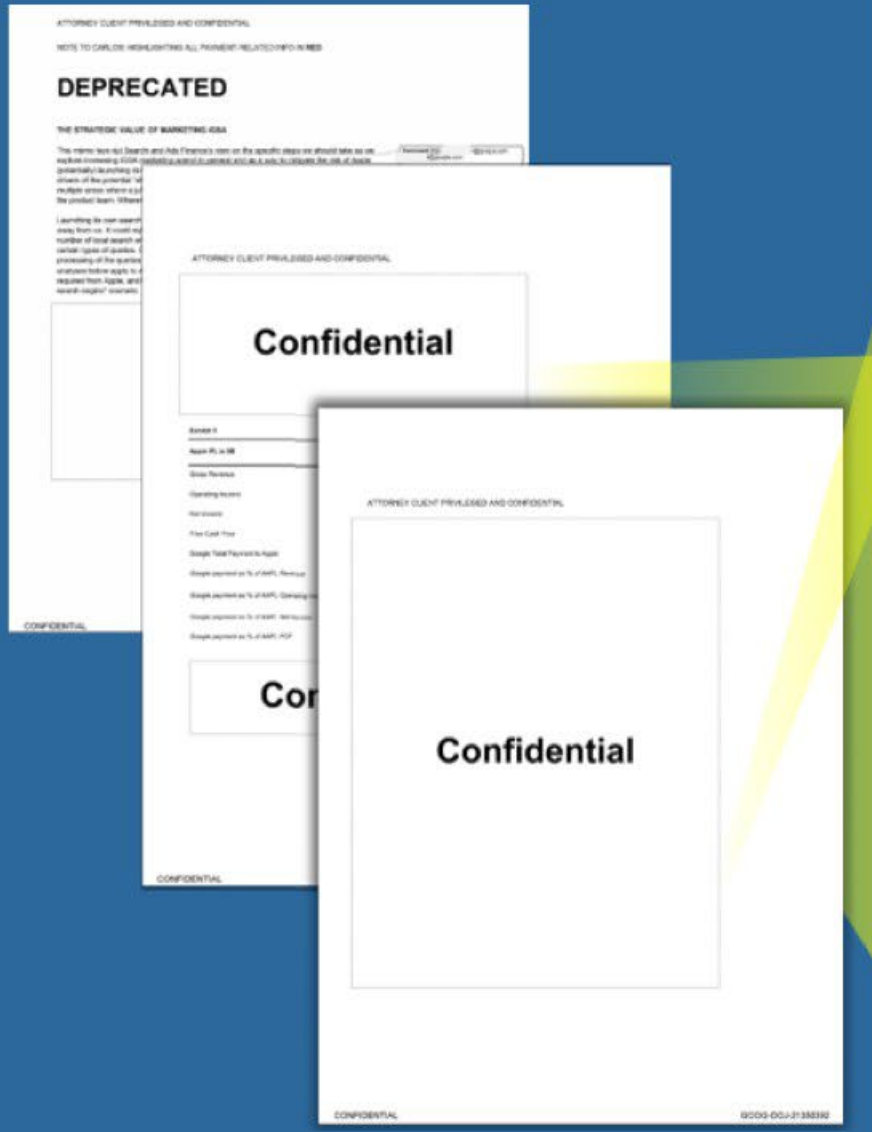
Google's "Go Big in Europe" was "above and beyond business as usual"



Okay, but what is "Go Big in Europe"? Starting March 1, 2020, all new Android devices sold in EU will offer a default search engine choice screen during phone setup. Go Big in Europe is product investments **above and beyond business as usual** to make sure Google is top of mind for EU users.

2019

Google recognizes that the ISA deters Apple from developing its own search engine

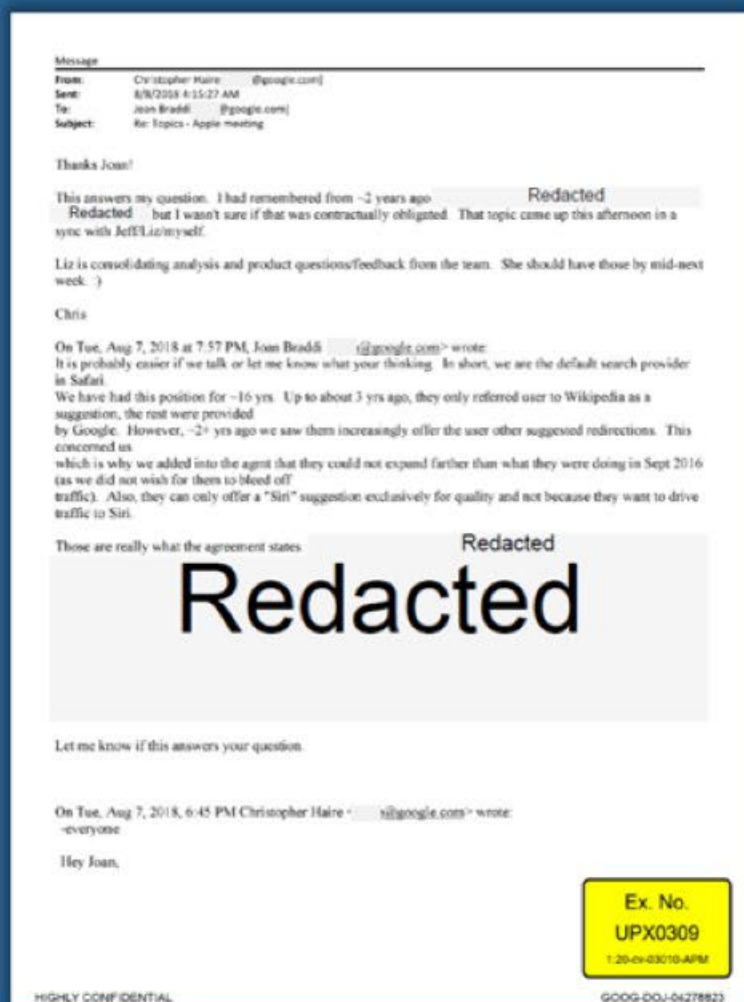


Redacted

Redacted

2019

Google's contract with Apple has prevented Apple's expansion into general search



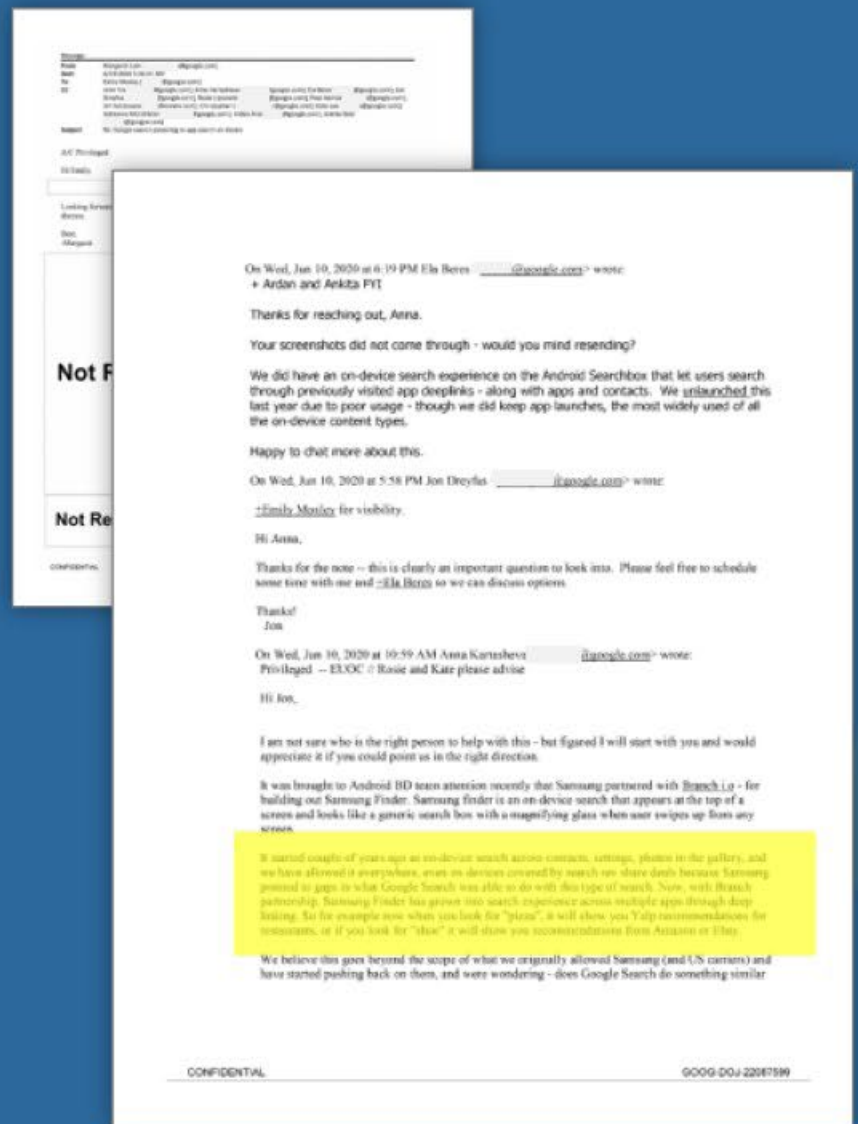
Up to about 3 yrs ago, they [Apple] only referred user to Wikipedia as a suggestion, the rest were provided by Google. However, ~2+ yrs ago we saw them increasingly offer the user other suggested redirections. This concerned us which is why we added into the agmt that they could not expand farther than what they were doing in Sept 2016 (as we did not wish for them to bleed off traffic).

Joan Braddi, *VP Partnerships*



2018

Google expressed concern about Branch creating a “search experience across multiple apps” on Samsung devices



It started [a] couple of years ago as on-device search across contacts, settings, photos in the gallery, and we have allowed it everywhere, even on devices covered by search rev share deals because Samsung pointed to gaps in what Google Search was able to do with this type of search. **Now, with Branch partnership, Samsung Finder has grown into [a] search experience across multiple apps through deep linking. . . . We believe this goes beyond the scope of what we originally allowed Samsung (and US carriers) and have started pushing back on them[.]**

Anna Kartasheva, Director of Product Operations and Strategy



2020

Google's contracts led Samsung to limit Branch's functionality



... I do realize this is much better experience vs. driving users to App Store without preview. However, the gating factor here is the Google-Samsung contract terms and anything that can be claimed by Google as 'web search' is something we need to avoid.

Junghan Kang, *Project Manager* 

2018

Google's RSA was a significant factor in AT&T's decision not to pursue additional innovative functionality with Branch



Jeffrey Ezell

VP Strategy and
Business
Development



A. . . . I consulted my legal team. They said it was ambiguous, but there was some risk that it would be inconsistent with the RSA. Then one of my team members floated the idea by Google to see what Google's opinion of it was, and I didn't see the communication on that, but I – the way it was reported back to me was that **Google indicated that they felt that it was inconsistent with the RSA. . . .** [I]t was enough uncertainty for me that I decided, as well as the device team who would have been responsible for doing that, **we just decided it wasn't worth . . . the uncertainty.**

2022 Deposition Testimony

Google considers competitive pressure (or lack thereof) when deciding whether to pursue privacy initiatives



**Prabhakar
Raghavan**

SVP Search & Ads



- Q.** . . . In considering whether to sign off on a privacy – potential privacy enhancement for Search, you would consider whether Google is losing queries to any rival; correct?
- A.** Correct.

Google has decided not to pursue privacy initiatives in the absence of competitive pressure

Message

From: Prabhakar Raghavan [mailto:prabhakar@google.com]
Sent: 4/23/2019 12:54:52 AM
To: Benedict Gomes [mailto:ben@google.com]
CC: Cory Ondrejka [mailto:cory@google.com]; Ben Fitzpatrick [mailto:ben@google.com]
Subject: Re: consumer council follow up ahead of notes

(dropping Nick)
Ben - I don't think that simply repackaging the content and telling us to not talk past each other is a good use of time, or will materially change the outcome. Let me try again.

- I agree that there's something worth exploring in this space of private search. But the working teams have to do **MUCH** more careful work before wasting our valuable time.

- I want to see evidence that there's a real impact on Google users, attributable to this factor.

- I disagree that this is "has to be gut". I even gave a clear example of a closely related question that we didn't resolve with "just gut". I'd have at least expected some curiosity of the form "Oh really, how?" A company at our scale and with our resources can't be run on gut when we have data available.

- I disagree with a methodology that consists of conflating "people care increasingly about privacy, DDG is making a lot noise about it, Sundar mentioned it in I/O" (all true statements) then concluding that this needs a product change.

- If the data supported it, I'd have expected the team to consult with Policy, Comms, Privacy and Revenue, before arriving at any product proposal. I recognize they're trying to move fast, but surely not at the expense of quality work?

- I was dismayed that we conducted 58 minutes of yesterday's meeting on "gut" then - the one place we had a real model (revenue) the reaction was "I don't believe it" (without seeing the analysis) and "I instead happen to think it's 5X" (i.e., the people who do incredibly precise revenue analysis week after week are surely wrong).

Net - I do want us to consider this topic again, but we have to go through the diligence suggested in Cory's and my emails.

On Thu, Jun 20, 2019 at 4:45 PM Benedict Gomes [mailto:ben@google.com] wrote:
In thinking about yesterday's conversation, I think we ended up talking past each other. I think there were two points of confusion.

- I think the original goal of the meeting was to look at DDG's privacy and what we could do in that context. So the framing was very DDG focussed (that was actually the explicit topic, I believe). I don't think anyone feels like we should strongly frame our external positioning w.r.t. DDG, but the meeting and our conversation ended up skewing in that direction.

- I also think that there were many things explored and we were talking about different things in terms of product and money. What I personally had in mind was fairly modest and I think we need to come back with a more focussed version that has the right ad numbers for that proposal.

Overall, I think we mostly agree the privacy sensitive search spot is an important positioning point that is a potential threat (whether it is DDG, Quora or something else) that we need to think about in the context of our environment and what we should do from both a product and marketing perspective.

Could we redo a part of that meeting with the more modest proposal and then see if we have the same AIs?

ben

ben

Ex. No.
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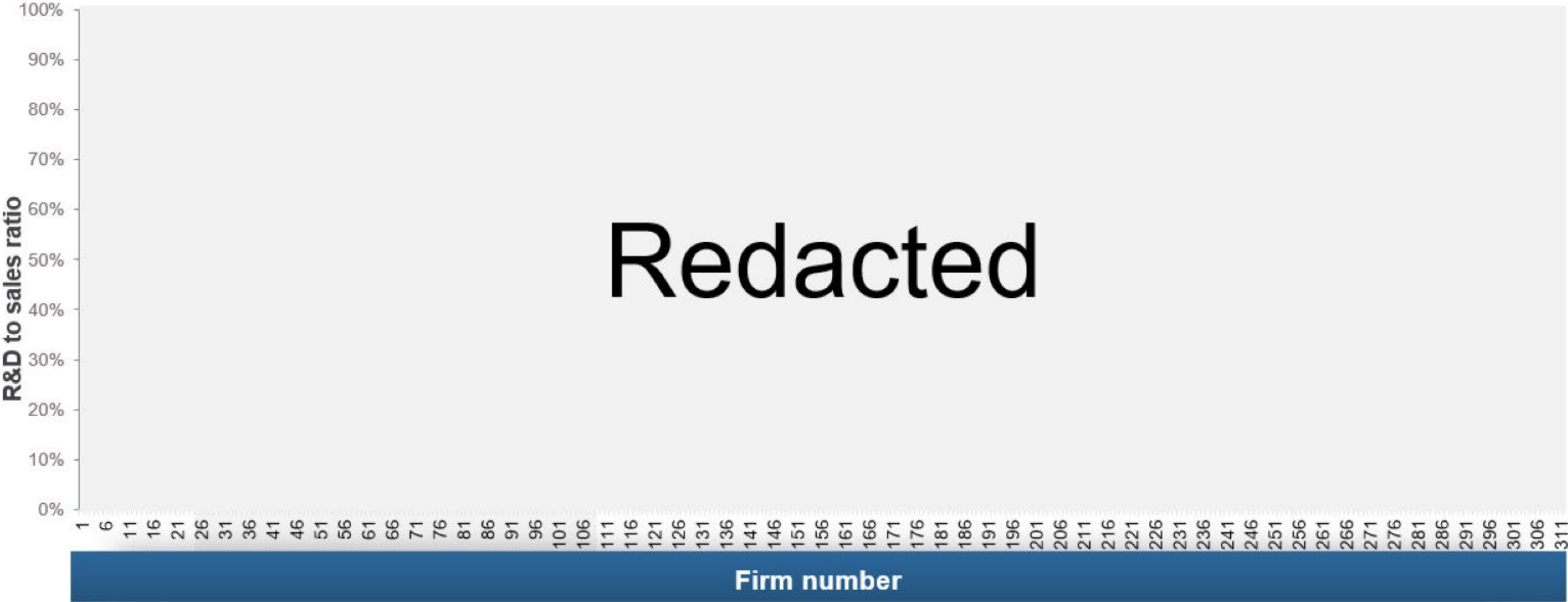
- But the working teams have to do **MUCH** more careful work before wasting our valuable time [on private search].
- I want to see evidence that that there's a real impact on Google users, attributable to this factor.

Prabhakar Raghavan, *SVP Search & Ads* 

2019

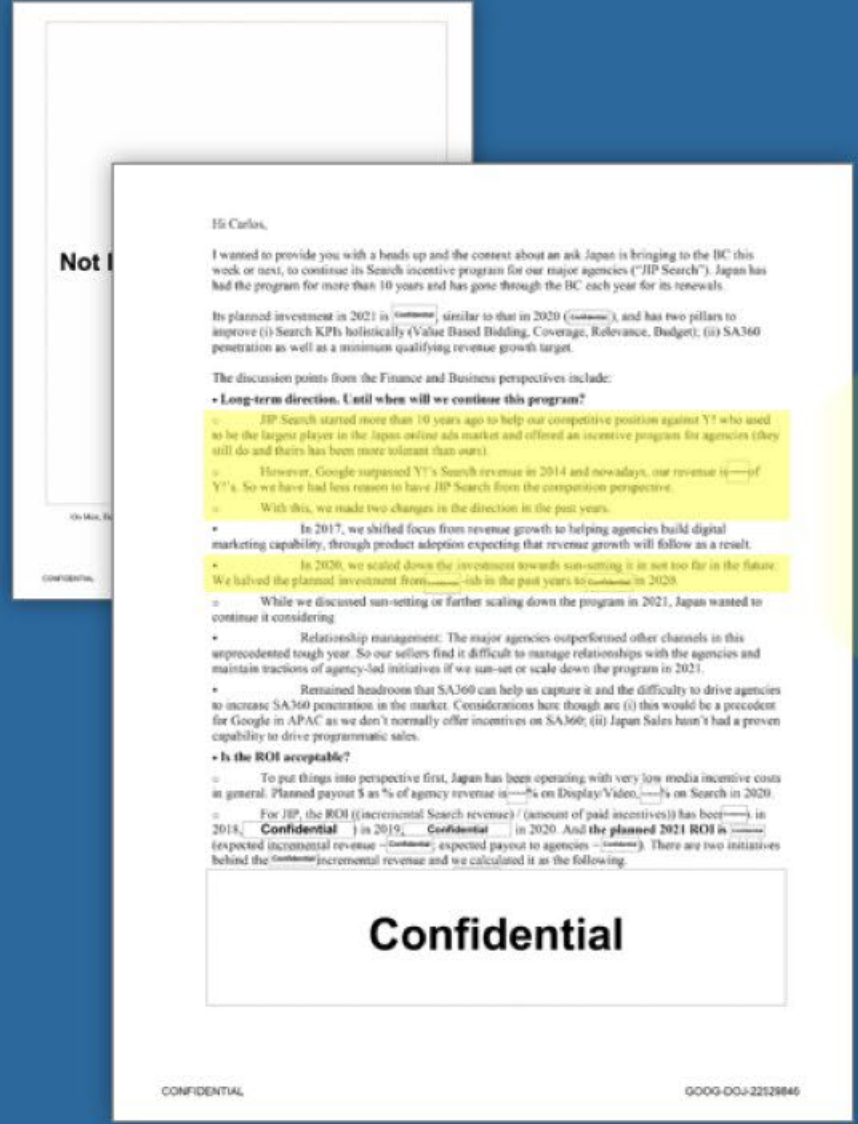
Google's R&D investment relative to sales is not large compared to other firms

R&D to Sales Ratio for Software and Computer Services Firms in The EU
Industrial R&D Investment Scoreboard, 2020



EU Industrial R&D Investment Scoreboard, 2021; (Israel Report, Fig. 1, at ¶ 31; Israel Report, Fig. 3, at ¶ 44); (Google Search+ R&D); (Whinston Report, Fig. 86, at ¶ 540); (Google Search+ revenue); (Whinston Rebuttal Report, Fig. 24, at 93).

Google responded to competition from Yahoo Japan with an advertiser incentive program



- **JIP Search started more than 10 years ago to help our competitive position against Y! . . .**
- Google surpassed Y!'s Search revenue in 2014 and nowadays, our revenue is [redacted] of Y!'s. **So we have had less reason to have JIP Search from the competition perspective.**
- With this, we made two changes in the direction in the past years. . . .
 - **In 2020, we scaled down the investment towards sun-setting it in not too far in the future.** We halved the planned investment from [redacted] in the past years to [redacted] in 2020.

2020

Google has not gone forward with ad launches that would have benefited advertisers but lowered Google's revenue



Redacted

Redacted

2013

CONCLUSION
