



Problems Posed by Ad-blockers

Browsing the web without ads or popups stealing your screen or autoplaying video ads making the page load as slowly as if it were being dialed up in the 1990s is a pleasant experience, so it's understandable that so many people these days choose to use ad blockers when surfing the internet. But what problems are posed to businesses by using ad-blockers?

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Introduction

Ad blocking can be defined as software that removes or alters advertising content on a web page, most commonly in the form of browser extensions. It mainly gives the user the option of choosing, allowing to them to either block websites or allow sites through by whitelisting them. Ad Blocking has been around for the past 15 years, having first become popular with Firefox and then grown to other systems.

My research on ad blocking investigates types of ads and the different methods and benefits of ad blocking itself. I will also consider the effects it has on websites that rely on ads for revenue, the long term effects it has on both sides and the web at large, performances issues, tracking, methods of fighting ad blockers and the future of ads on the internet. I am interested in what effect ad blocking will have on the way revenue models change and what is the most effective.

Before beginning into the research, I will define some of the key names of ads and ad blocking terms used throughout this paper. Whitelist describes sites that will not be ad-blocked. Several important types of ads include:

1. **Web banner advertising:** A banner ad is a graphic image used on most web pages, which can differ significantly in appearance and subject matter. These ads appeal to most users and clicking on them takes you to the main website of that product.
2. **Wallpaper advertisement:** An ad appears and changes the background of the website.
3. **Frame ads** were the first form of web banners. Website publishers incorporate frame ads by setting aside a designated space on the web page.
4. **Pop-ups ads** are displayed in a new web browser window that opens above a website visitor's initial browser window.

5. **A floating ad**, or overlay ad, is a type of rich media advertisement that appears superimposed over the requested website's content.
6. **News Feed Ads (social)** are intertwined with non-promoted news through which the users are reading. These advertisements can be of any content, such as promoting a website, a fan page, an app, or a product.
7. **A text ad are** text-based hyperlinks. Text-based ads may display separately from a web page's primary content, or they can be embedded by hyperlinking individual words or phrases to advertiser's websites.¹²

Video/Audio adverts, as seen on YouTube and Spotify can be broken into the following categories:

- **In-Stream Video Ads** are the major type of video advertisement. They play in the video player before, during or after a piece of video content.
- **Linear Video Ads** are ads which are commonly called pre-roll ads. This type of ad can give the user a choice of which advert to watch or when to watch the ad.

Ad blocking throughout this paper will be classified as a term not limited to a platform or device.

¹ "Online advertising - Wikipedia, the free encyclopedia." 2011. 1 Apr. 2016
<https://en.wikipedia.org/wiki/Online_advertising>

² "Digital marketing - Wikipedia, the free encyclopedia." 2011. 1 Apr. 2016
<https://en.wikipedia.org/wiki/Digital_marketing>

Research Summaries

I will begin my description of my research with an account on the benefits of adblockers for the user, before moving on to their short terms effects, followed by the long term effects of adblockers and the future of web advertising.

What is Ad blocking?

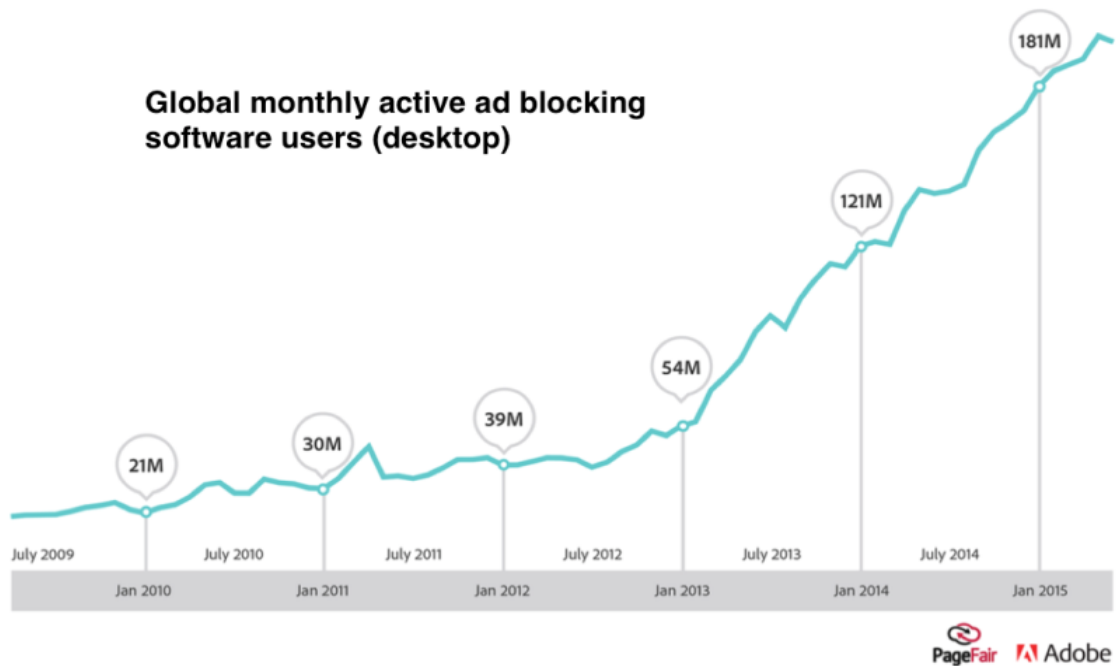
Ad-blocking means that ads do not appear for the user because the user uses technology to screen them out. Many browsers block pop-up adverts by default. Other browser add-ons may also block the loading of ads or block elements on a page with behaviors characteristic of advertisements. Approximately 9% of all website views come from browsers with ad-blocking extensions installed,³ and some publishers have 40%+ of their visitors using ad-blockers⁴.

There are several ad blockers available, but the most popular is Adblock Plus. Adblock Plus has no core functions; however it does come bundled with pre-selected lists of what to block, known as filter lists. Filter lists are normally an extensive set of rules that tell Adblock Plus which parts of a website to block. You can add any filter list you want, for example, block tracking or malware. You can also create your filter lists. Almost all filters are open source. Many filter lists have been established by Internet users.⁵

³ "What is the percentage of Internet users that employ ... - Quora." 2010. 28 Mar. 2016 <<https://www.quora.com/What-is-the-percentage-of-Internet-users-that-employ-AdBlock-Plus-or-similar-ad-blocking-plugins>>

⁴ "The 2015 Ad Blocking Report | Inside PageFair." 2015. 28 Mar. 2016 <<https://blog.pagefair.com/2015/ad-blocking-report/>>

⁵ "About Adblock Plus." 2015. 28 Mar. 2016 <<https://adblockplus.org/about>>



Ad blocking as a whole has seen a 41% growth year over year, which demonstrates how dramatically its popularity has increased.⁶ In the US alone, it grew 48% and now has 45 million active users in the U.S. between Q2 2014 and Q2 2015 for mobile and desktop users.⁷

⁶ "The 2015 Ad Blocking Report | Inside PageFair." 2015. 28 Mar. 2016
<<https://blog.pagefair.com/2015/ad-blocking-report/>>

⁷ "Problems Posed by Ad-blockers - Projectbird." 2016. 28 Mar. 2016
<<http://www.projectbird.com/problems-posed-by-ad-blockers.html>>

Benefits to The User

No one can deny that ad blockers are extremely practical. Not only can you use them to block or hide offensive material and other unpleasant things but they can also prevent malicious code from being run, which will be discussed in further detail later.

As most people know, ads on the web can be very annoying, but some people, myself included, prefer not to block every ad they see, as advertising is how most websites make their money, so that they can keep providing free content.

However, even if you don't block ads, it may be worthwhile to install an ad blocker for the following reasons:

- Quicker loading
- Cleaner looking web pages
- Longer battery charge on mobile phones.
- Freedom from advertising
- Less resource waste (bandwidth, CPU, memory, etc.)
- Privacy benefits (the exclusion of the tracking and profiling systems of ad delivery platforms)
- Substantial energy savings
- Financial benefit in filtering an ad before it can load (for users who pay for total transferred bandwidth, like most mobile users worldwide)

Another important aspect is the improved security. Online advertising exposes users to a higher risk of infecting their devices than surfing pornographic sites⁸, which I will discuss later in the report.

⁸ "The Top Ten Most Dangerous Things You Can Do Online." 2010. 28 Mar. 2016
<<http://gizmodo.com/5614047/the-top-ten-most-dangerous-things-you-can-do-online>>

Performance

Using an Adblocker has a significant impact on loading speeds⁹, but improved loading does not come without some side effects, such as memory or RAM hogging (an acronym for random access memory, a type of computer memory which can be randomly accessed. It governs the overall speed of the computer)¹⁰.

As stated by Mozilla developer Nicholas Nethercote, having Adblock Plus running in the background on Firefox 40 (not including Google's Chrome) results in a memory hit in the range of 80-100MB. However, the biggest problem is the process by which Adblock Plus blocks ads¹¹.

Simply put, Adblock Plus inserts a huge CSS stylesheet, roughly taking 4MB of RAM into every single web page that you visit, stripping out the ads and overriding existing style sheets.

We live in the era of the web 2.0, where it is very common for a web page to have lots of iframes and different loading of elements and API calls, which are separate, individual web pages that are loaded and embedded within the page which the user is currently viewing. The most widely used example is that of feature loaded social sharing widgets such as on Facebook. When you add a widget to your site, it is made up of an iframe containing a separate web page hosted on Facebook's servers. Given that web pages are growing ever more complicated, having an ad blocker which takes up 4MB of RAM per tab is simply not sustainable.

⁹ "The Rise of Ad Blockers: Should Advertisers Be Panicking ..." 2015. 28 Mar. 2016
<<http://www.wordstream.com/blog/ws/2015/10/02/ad-blockers>>

¹⁰ "What is Random Access Memory (RAM)? Webopedia ..." 2002. 28 Mar. 2016
<<http://www.webopedia.com/TERM/R/RAM.html>>

¹¹ "Firefox 41 will use less memory when running Adblock Plus ..." 2015. 28 Mar. 2016
<<https://blog.mozilla.org/nnethercote/2015/07/01/firefox-41-will-use-less-memory-when-running-adblock-plus/>>

In Nethercote's testing, he used TechCrunch as an example. The site used around 194MB of RAM without ABP enabled but that doubled to 417MB with ABP enabled, after triggering all of the social widgets and plugins.¹²

I was curious and upon emulating his experiment, I found ABP had the same effect on RAM use in Chrome, producing very similar results.

However, despite the regrettable effect adblocking has on RAM, the decrease of loading ads (pre-rendering the page and injecting the CSS) results in an enormous performance improvement, i.e. loading time, as can be seen in the results of the test below on the homepage of the popular website The Los Angeles Time.

The Los Angeles Times	With AdBlock	Without Adblock
Loading Times (seconds)	11	4
Size of page (mb)	5.7	1.5mb

It is evident that adblocking has a significant effect on the loading and rendering of web pages.

¹² "Iframe irony: Adblock Plus is probably the reason Firefox and." 2014. 28 Mar. 2016
<<http://www.extremetech.com/computing/182428-ironic-iframes-adblock-plus-is-probably-the-reason-firefox-and-chrome-are-such-memory-hogs>>

Developers

Given the fact that download speed is such a crucial issue for users, I decided to carry out some informal research on developers attitudes to ad loading.¹³

In my poll, I asked developers whether they optimize the loading of ads on their web pages, using the tools such as Async loading.

In computer programs, asynchronous operation means that a process operates independently of other processes.¹⁴ According to my results, the majority of web developers do not prioritize this, so it is easy to see why users would opt for adblockers, as the developers are not considering the time taken for loading ads in their apps or websites.

¹³ "Robert Gabriel on Twitter: "Doing Research on adblockers ..." 2016. 28 Mar. 2016
<https://twitter.com/wobert_gabriel/status/689922654204227584>

¹⁴ "What is asynchronous? - SearchNetworking - TechTarget." 2010. 28 Mar. 2016
<<http://searchnetworking.techtarget.com/definition/asynchronous>>

Security

Third party advertisements can present a serious threat to computer security. For example, in a high-profile case, malware was distributed through advertisements provided to YouTube by a malicious customer using Google's Doubleclick¹⁵ and in August 2015, a 0-day exploit in Firefox browsers was discovered in an advertisement running on a website.¹⁶

The website Forbes requires users to disable ad blocking before viewing their website, however, in one incident, some of the website's users were served with pop-under malware once they had disabled their adblockers¹⁷. These examples all demonstrate that adblockers not only make surfing the internet more comfortable for the user but also safer.

Another major reason why people use ad blockers is that some advertisements make use of snippets of code that perform functions on a web page. This can be easily exploited to gain access to users' cookies which can have sensitive information.

Advertising platforms take advantage of tracking which profiles user behavior based on the sites they visit, content blockers are popular with people who do not want their online browsing history sold to advertisers and advertising networks. This is what makes add-ons like Adblock Plus so popular among users who want privacy.

¹⁵ "Ad blocking - Wikipedia, the free encyclopedia." 2011. 28 Mar. 2016

<https://en.wikipedia.org/wiki/Ad_blocking>

¹⁶ "0-day attack on Firefox users stole password and key data ..." 2015. 28 Mar. 2016

<<http://arstechnica.com/security/2015/08/0-day-attack-on-firefox-users-stole-password-and-key-data-patch-now/>>

¹⁷ "Forbes Site, After Begging You Turn Off Adblocker, Serves Up." 2016. 28 Mar. 2016

<<https://www.techdirt.com/articles/20160111/05574633295/forbes-site-after-begging-you-turn-off-adblocker-serves-up-steaming-pile-malware-ads.shtml>>

Problems posed by ad blockers

The economic consequences which ad blocking entails for online business were stated explicitly in a 2015 report by Adobe/PageFair, which said that the cost to publishers in 2016 alone could be as much as €22 billion.¹⁸

For example, if an ad is running on a website but is snubbed by the user because their ad-blocker is hiding it, this ad provides no value to the web owner. If users ignore advertisements, advertisers perceive little value in putting brands in front of them. As a result, sites are rarely paid “per click”. Instead, the standard metric for selling web display ads is “CPM”, or “cost per mille”—the cost for a thousand views^{19 20}.

The majority of websites on the Internet exist because of advertising. Millions of websites, from soccer moms’ personal blogs to huge online magazines such as Wired, depend on advertising revenues to keep running the website as a living.

Ad blockers have been available for years, but now Apple have endorsed them, allowing people to produce ad blocking technology for their app store²¹. For one of the largest technology companies in the world to openly support ad blocking is big news because it sets the stage for ad blockers’ user base to grow at an even greater rate.

According to data from Adobe and PageFair, the adoption of desktop ad blockers has risen in recent years, from approximately 21 million users in 2010 to more than 181 million users in January of this year.²²

¹⁸ "The 2015 Ad Blocking Report | Inside PageFair." 2015. 28 Mar. 2016
<<https://blog.pagefair.com/2015/ad-blocking-report/>>

¹⁹ "Cost Per Thousand (CPM) Definition | Investopedia." 28 Mar. 2016
<<http://www.investopedia.com/terms/c/cpm.asp>>

²⁰ "Cost per mille - Wikipedia, the free encyclopedia." 2011. 23 Mar. 2016
<https://en.wikipedia.org/wiki/Cost_per_mille>

²¹ "Apple's Ad-Blocking Is Potential Nightmare for ... - U.S." 2015. 28 Mar. 2016
<<http://blogs.wsj.com/cmo/2015/08/28/apples-ad-blocking-is-potential-nightmare-for-ad-sellers/>>

²² "The Rise of Ad Blockers: Should Advertisers Be Panicking ..." 2015. 28 Mar. 2016
<<http://www.wordstream.com/blog/ws/2015/10/02/ad-blockers>>

Regarding ad blockers' potential impact on advertisers, opinions are mixed. The same report by Adobe and PageFair states that the rise of ad-blocking technology will cost advertisers more than \$40 billion by 2016.²³ It's hard to say how bad the damage could be, however, I believe it be lower and closer to 1 billion mark.

It is inevitable that the rise of ad blockers will affect advertisers, therefore, the real question is how they will be affected, and in what numbers. Some advertisers may soon notice a huge impact on the performance of their price per click campaigns whereas others won't notice any change at all.

This development can be compared to Google's algorithm updates²⁴ during which some sites are badly affected by changes in the ordering and display of search results.

Ad blockers affect the display of price per click and text based ads across Google AdWords and other advertising networks, meaning any active campaign could potentially be affected by increased adoption of these software programs.

For example, if you're running a price per click campaign targeting mobile users on devices such as Apple's, and they have an ad blocker installed, they won't see your ads. It doesn't matter what extensions you're using, how many ads or how good they are, they won't see your ads.

On the other hand, it is important to remember that the majority of people browsing the web don't have any ad blocker installed at all, and just because the option is there and growing in popularity does not mean that all users are going to radically change their behavior and install an adblocker.

²³ "The Rise of Ad Blockers: Should Advertisers Be Panicking ..." 2015. 28 Mar. 2016 <<http://www.wordstream.com/blog/ws/2015/10/02/ad-blockers>>

²⁴ "Google Algorithm Change History - Moz." 2014. 28 Mar. 2016 <<https://moz.com/google-algorithm-change>>

According to an official blog post (September 30th of 2015), Google will no longer charge display network advertisers for impressions which are not viewable to users²⁵²⁶. Simply put, if an ad isn't seen by the user, whether that is due to an ad being in another tab, or scrolled out of view or if the ad is being blocked by an ad blocker, the advertiser won't be charged. This move is likely to be a reaction to the concerns about the adoption of ad blockers in both iOS and browser extensions, as the problems stated in the blog post have been an issue for advertisers for some time.

There are still many potential problems caused by adblockers such as:

1. An end to free content
2. A decrease in quality of content
3. Access only to incomplete information for users
4. The inability to understand the customer because of their anonymity
5. Loss of revenue

These issues stem from adblockers because publishers are being forced to try other means to increase revenue, for example, by increased use of paywalls, which will be discussed in greater detail later, and by pushing out more articles and sacrificing quality for quantity as a result.

²⁵ "Google says it won't make advertisers pay unless ads are 100." 2015. 29 Mar. 2016
<<http://9to5google.com/2015/09/30/google-display-ads-viewable/>>

²⁶ "Inside AdWords: Enhancing the Google Display Network ..." 2015. 29 Mar. 2016
<<http://adwords.blogspot.com/2015/09/Enhancing-the-google-display-network.html>>

Fighting Adblockers

When Apple announced that it will allow ad blocking in Safari for iOS 9.3 last September, it brought a conflict that had been building in the web community for years to the fore.

Some sites try to prevent users from accessing their content while their ad blocker is enabled. For example, Forbes.com is one of many sites which do not allow to access the site without disabling the extension or whitelisting the website.

Not everyone is convinced by this method, for example, Johnny Ryan of PageFair believes ad blocking walls are relatively easy to bypass.²⁷ and he is right. **"Often publishers only update their code, forcing the ad blocking community to get working again. It is a coding tug of war,"** he stated.

PageFair, among other sites, has been employing more user friendly methods of circumventing ad blockers. They enable publishers to display **"respectful and unobtrusive ads"** that do not get blocked by ad blockers.

Another approach to the war on ad blockers is exemplified by former Mozilla co-founder Brendan Eich, who launched a browser called Brave²⁸. This browser replaces ads on websites with safe, non tracking ones which do not take users' data or slow downloading speeds. He stated that they plan to pay publishers a higher proportion of ad revenues generated by not going through a third party middleman.

Privacy app Ghostery shows users which ad-serving technologies a website or web app is being used, and then Ghostery offers the option to blacklist (block) or whitelist those ad-serving technologies.

²⁷ "Inside PageFair | Monitoring adblock and the future of the ..." 2015. 29 Mar. 2016
<<https://blog.pagefair.com/>>

²⁸ "GitHub - brave/browser-ios: Brave iOS Browser." 2016. 29 Mar. 2016
<<https://github.com/brave/browser-ios>>

Another method of fighting adblockers is showing the users a variety of messages designed to make them think about using adblocker or asking them to whitelist the website. A great example of this is the New York times,²⁹ who show users with ad blockers enabled the following message: **“The best things in life aren’t free. You currently have an ad blocker installed. Advertising helps fund our journalism. To continue to enjoy The Times, please support us in one of the following ways.”**

Other solutions include subscribe to the publication, or to “whitelist” it so that the ad blocker stops working for the website in question.

²⁹ "NY Times starts fighting ad blockers with plea to users ..." 2016. 29 Mar. 2016
<<http://www.digitaltrends.com/mobile/ny-times-fights-ad-blockers/>>

Going Native

As a result of ad-blocking, many advertisers have turned to developing native advertising³⁰. Native ads look a lot like that of the content produced by the web publishers, but they usually carry some kind of design or banner feature to distinguish it from non-sponsored content normally at the end of the article.

According to the Association of Online Publishers, companies also need to display ads that don't annoy consumers in the first place.³¹

This is why mobile video is proving so popular as an ad format because it is engaging if done well, therefore, better chance of the viewer watching all of it. Mobile video will account for 87% of global advertising spend by 2018, according to ZenithOptimedia.

Websites such as WIRED and FORBES, which will not let users view their website if they are using an adblocker of some kind, offer the following alternatives:

1. You can simply add WIRED.com to your ad blocker's whitelist, so you view ads. When you do, we will keep the ads as "polite" as we can, and you will only see standard display advertising.
2. You can subscribe to a brand-new Ad-Free version of WIRED.com. For \$1 a week, you will get complete access to our content, with no display advertising or ad tracking.

³⁰ "The future of digital ads: Native and social set to spike." 2015. 29 Mar. 2016
<<http://www.cnbc.com/2015/11/24/the-future-of-digital-ads-native-and-social-set-to-spike.html>>

³¹ "AOP - Research - DLR Issue 84 January 2016." 2016. 1 Apr. 2016
<<http://www.ukaop.org/research/research/dlr-issue-84-january-2016>>

Possible solutions and the Future of Advertising

Advertisers are expected to spend \$23 billion on social media campaigns, a 33% increase from the last year of 2014, according to research from eMarketer.

It would be possible to improve the use of ad blockers by optimizing delivery of ads on websites using an async tag as stated by earlier in this report, or by integrating them into the site in such a way that it is not annoying to the user.

Possible solutions

- The Freemium Model
- Subscription Model
- Go Native
- Pay the Ad Blockers
- Ask Audiences for Sympathy
- Block Content From People Who Use Ad Blockers
- Offer Ads Free versions

As the methods of fighting ad blockers are not particularly successful, it would be better to change the adverts themselves so that they are less irritating and harmful to users. As stated by Google's former senior vice president of advertising, Susan Wojcicki³², the future of ads depends on whether advertisers choose to follow the suggestions below, which would encourage users not to rely on adblockers.

- Ad views will be voluntary.
- Users will participate in the ecosystem if we provide enough value and control.
- Ads will be more interactive and beautiful—at scale.
- Ads will help people live their lives on the go.

³² "Susan Wojcicki - Wikipedia, the free encyclopedia." 2011. 29 Mar. 2016
<https://en.wikipedia.org/wiki/Susan_Wojcicki>

Some websites have adopted these futurist, interactive ad formats, with a great deal of success, such as with engagement ads, which show standard ad formats, when users hover their mouse over the ad more features come up. This gives users an opportunity to be more creative and involved in the advertising process, which makes them more popular. This method has been used very effectively by companies such as Samsung, who live streamed their 90-minute Galaxy S4 launch event via multiple channels³³, including ads.

Susan Wojcicki also advocates advertising where the user is choosing to view an ad, so that publishers are paid on a cost-per-click basis. It's up to the ad network and the publisher/developer to show the right ad at the right time to the user.

TrueView ads on YouTube follow this model. About 70% of ads on YouTube are now classed as TrueView which has led to a reduction of 40% in drop off of ad viewing. One ad on YouTube got 33 million views, an ad by Pepsi featuring nascar car driver Jeff Gordon, going undercover to buy a car. It got 33 million views even though it was four minutes long because it was entertaining and relevant.³⁴

According to many other reports, a good advert on a website should follow these guidelines:

- Not annoying.
- Not disrupting or distorting the page content the user is trying to read.
- Transparent with the user about being an ad.
- Effective without shouting at the user.
- Appropriate to the site that the user is on.³⁵

Unfortunately, many websites do not follow these rules and with the ever changing landscape of the internet, it remains impossible to predict what exactly ads should be in future.

³³ "Here's The Future Of Advertising, According To ... - Forbes." 2013. 29 Mar. 2016
<<http://www.forbes.com/sites/roberthof/2013/04/10/heres-the-future-of-advertising-according-to-google/>>

³⁴ "YouTube Creator Blog: Getting people to your channel, and ..." 2011. 29 Mar. 2016
<<http://youtubecreator.blogspot.com/2011/10/getting-people-to-your-channel-and-how.html>>

³⁵ "Here's The Future Of Advertising, According To ... - Forbes." 2013. 29 Mar. 2016
<<http://www.forbes.com/sites/roberthof/2013/04/10/heres-the-future-of-advertising-according-to-google/>>

Conclusion

As stated throughout my report, it is difficult to define exactly what the future of adverts on the web should be. However, it is possible to attempt to follow the above mentioned set of rules in order to make ads less annoying and ensure that users won't have to use ad blockers as much.

In the ever changing landscape of web advertising and the ad blocking world, it is up to both the developers and the advertisers to better understand their target audience and to improve their engagement with the user, thus making them more likely to click on the ad than to be annoyed. Ideally, advertisers should follow the guidelines suggested by Susan Wojcicki. However, different sites host different content and therefore should employ different methods, be that a request for whitelisting, a paywall or native apps.

At the end of the day, it is impossible to prevent people from using ad blockers, therefore publishers and advertisers must make it worth the user's while to surf the web without this software, by creating entertaining, non-invasive adverts tailored to their needs and interests. On the other hand, users need to be aware that they cannot expect free content if they do not also accept a certain amount of advertising, therefore the future of web advertising hinges on the willingness of both sides to compromise.

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