

# **The Evolution of Online Marketing and the Implications of its Current Practices**

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Chris Han  
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On my honor as a University Student, I have neither given nor received  
unauthorized aid on this assignment as defined by the Honor Guidelines  
for Thesis-Related Assignments

## **“If you’re not paying for the product, you are the product”**

The title of this section originates from the short film “Television Delivers People” (1973) in which artist Richard Serra argues that all television programming was curated in order to sell commercial airtime and benefit corporate sponsors (Oremus, 2018). Despite this critique of television media, commercials and advertisements are now seen as a minor nuisance and as a necessary consequence for free or cheap service. While this statement was made during the 1970s, it has become even more relevant in the 2010s with the Internet becoming the preferred way of consuming media.

The Internet has revolutionized the way that advertisers works by enabling two-way communication between consumers and advertisers. This new ability allows organizations that control the advertising platforms to collect data on users that could benefit advertisers. To those that were concerned about corporate influence on television programming in the 1970s, this shift towards online advertisements is a serious threat to society. Advertising platforms such as social media websites and search engines have the ability to track users’ behavior in order to personally curate advertisements for each user. However, this level of data access has many users concerned about how their data is being used as well as the risks of not being in control of their own personal data (Rainie, 2017).

This concern over personal data is not unwarranted. In 2018, both Facebook and Google experienced a data breach affecting millions of users (O’Flaherty, 2018). Both companies have also been known for using shady user privacy disclosure agreements, which was the reason for Facebook receiving a \$5 billion fine by the Federal Trade Commission (“FTC Imposes \$5 Billion Penalty and Sweeping New Privacy Restrictions on Facebook”, 2019). This is a record-breaking fine by the FTC indicating that the level of privacy violations are unprecedented. With

the issue of technology companies exploiting user data involving millions of people and billions of dollars, it is clear that the effects of this issue create a major impact on today's society. In order to analyze this impact, it helps to investigate how marketing practices got to this point, specifically from the lens of technological momentum. Technological momentum is the STS framework that changes in society are caused by both technological and social factors. Under technological momentum, technology has more of an effect in the early stages of change, but become less influential as institutions become more established and begin influencing changes in technology (Hughes, 1994). In this research, technological factors that led to the shift from advertising on traditional media to online platforms is explored. This research also investigates how technology companies and advertising companies responded to this change. After understanding the evolution of online marketing, the perspective of users is considered as they are confronted with a potential threat to their privacy.

### **Research Question and Methods**

How has online marketing changed from 2010-2019, and how are users responding to the potential privacy implications?

This question is answered through documentary research of studies and statistics pertaining to online marketing throughout the decade of study. Since the research mainly focuses on the changes throughout the decade, statistics provide easily quantifiable data that shows the difference between the beginning and end of the decade. Revenue data of social media companies were used to show the growth of these businesses over the decade. In order to investigate the privacy implications, articles on certain events, such as the Cambridge Analytica scandal, and government agencies such as the Federal Trade Commission (FTC), are used to identify and explain specific shifts in sentiment among different stakeholders. These stakeholders

include users, businesses, social media companies, and the government. The other research method used in this investigation is auto-ethnography. As a frequent social media user, evaluating personal experience is important because of the relevance of the topic on today's society, making it easy to come up with relevant examples as a starting point for research. Taking-into-account personal experience is also a useful way of understanding with public sentiment on user privacy in the age of social media and its potential implications.

### **The Rise of the Internet**

In 2010, the Internet was just beginning to shape into the Internet we know today. Facebook had just released their application for mobile phones. Netflix's streaming service was beginning to replace their DVD mailing service. Apple had just released their fourth-generation iPhone. While mostly a milestone by date, these events also signaled the start of society's dependence on the Internet for day-to-day life. Today, it is hard to imagine a life without knowing what friends are up to because of what they post on social media or being able to stream a specific show on-demand all from a mobile device.

The main technological factors that led to the dependence on the Internet in the 2010s are improved broadband access, increased usage of mobile devices, and the rise of social media platforms. Over the decade, broadband access has become more available as Internet infrastructure began expanding into rural areas of the United States as well as in developing countries (Roser, Ritchie, & Ortiz-Ospina, 2020). Broadband Internet also experienced increases in speed as the technology improved with fiber optics networks, which allowed the Internet to be used for activities other than basic browsing such as streaming media. In 2019, average Internet speeds have increased to 100 megabits per second from 5 megabits per second in 2010 (Villas-Boas, 2019).

Mobile devices have also contributed to the increase in Internet usage not only by increasing the number of Internet-using devices, but also making access to the Internet easier. This is especially true in poorer countries where mobile devices and wireless broadband is cheaper compared to computers and fixed broadband services. It is projected that there will be 2.8 billion mobile device users in 2020. While mobile devices only account for 48.2% of Internet usage globally, mobile advertisements account for over 72% of total ad spending (Butt, 2020).

The improvements in Internet accessibility and speed would mean nothing without the platforms that take advantage of these improvements, the most popular being social media platforms. Social media allows users to share everything from personal moments to current events with others all over the world. For context, Facebook has quadrupled their number of users since 2010 bringing the world even closer together (Roser, Ritchie, & Ortiz-Ospina, 2020).

### **Recognizing the change**

As the Internet began to change, users, businesses, and social media companies started to discover new ways to take advantage of this ability to reach more people. For example, there has been an increase in musicians on the Internet as they realize they no longer need to be signed to a record label when they are able to build a social media following and upload their content to online streaming services. Social media companies, in the interest of maintaining and increasing their user base, have made this easier by adding new features onto their platform. Facebook, for instance, lets users to create business pages allowing them to centralize information on their business as well as directly communicate with customers. Facebook has also invested a lot of research and development into their advertising infrastructure. They have developed features b allowing users to easily run their own targeted advertisements on certain groups based on location and demographic. They are able to do this because of the abundance of user data that

they are able to collect based on their social media usage such as searches and page likes (Newberry, 2019). Businesses have taken advantage of this feature by handling their own marketing using social media platforms as opposed to advertising on traditional media such as television and newspapers (Pensworth, 2019).

### **Technological Momentum and the Internet**

With social media bringing the world closer together, the amount of personal information that is accessible online is unprecedentedly high. Social media platforms not only have access to your online usage, but also personal identifying information such as birthdays and location. Because of this, users must be wary of the information that they put online as well as the parties that have access to their data.

The shift in people's perspective on personal privacy is explored in this paper through the lens of technological momentum. Technological momentum is the framework in which technology is the driving force in the beginning of societal change. Once the technology becomes well established within society, it is the social factors that drive the change in technology (Hughes, 1994). This framework is a combination of technological determinism and the social construction of technology (SCOT). Technological determinism is a framework that views changes in technology is the main factor in societal change. The social construction of technology is the framework that views social factors as the main factor in technological change. Technological momentum combines both frameworks by employing technological determinism at the introduction of the technology and then the social construction of technology at the emergence of a new institution.

This is a useful framework for exploring the evolution of online marketing as it is time-dependent and take into account the technological as well as the social factors of the situation.

The increase in Internet usage and online platforms encouraged people to use these platforms for various purposes. Online marketing did not catch on as quickly until users populated these platforms. As Internet usage caught on to the mainstream, social media companies began focusing on improving their advertising infrastructure rather than bringing the world closer together as originally intended. Scholars have criticized this framework by saying that technological momentum does not clearly identify a single cause, technological or social, for a certain change. However, this paper will continue to use technological momentum as a framework because the complexity of the topic cannot be boiled down to a technological or social cause.

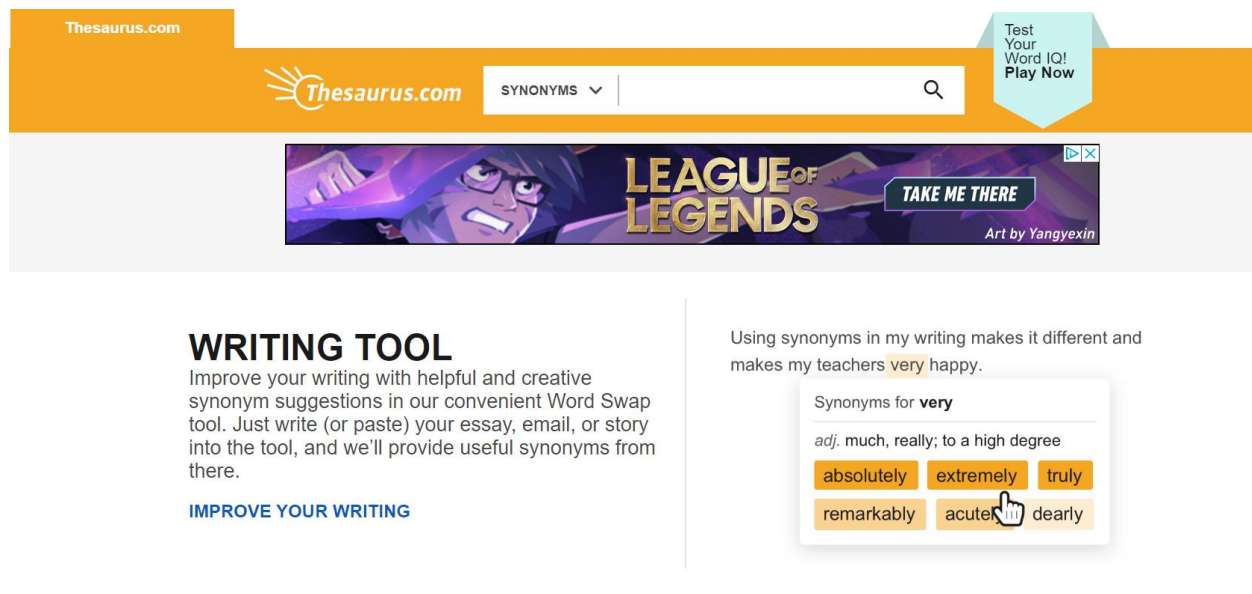
## **Results**

Over the past decade, the use of online marketing has increased dramatically. The rate at which people use the Internet increased due to improvements in accessibility, as well as the quality of online platforms. Online advertisements have improved from banner advertisements to targeted advertisements that track user behavior. Social media users as well as policymakers became more aware of the information gathering done by social media companies due to recent events, such as the Cambridge Analytica scandal. Concerns grew as people became worried about the potential risks of their personal data and behavior being tracked by these social media companies. These concerns have put some pressure on social media companies to become more transparent about their handling of user data. Users that are particularly protective over their privacy have limited the personal information they have online as well as adjust privacy settings on social media platforms and Internet browsers in order to restrict the number of parties that can see their data. However, there has yet to be a major change in the status quo in terms of how most people use the Internet. The general sentiment among online users is that they are

indifferent to how social media companies use their data because there is no imminent risk to their safety and it is seen by some as being beneficial to how they use the Internet.

## Early Online Advertisements

In the early days of online marketing, advertisements were mostly limited to banners displayed on the side of a website's main content. These advertisements resembled the format of newspaper advertisements, a popular medium of traditional advertising.



An example of a banner advertisement for the video game "League of Legends". Retrieved from Thesaurus.com

These kinds of advertisements are still used today as shown in the screenshot above of Thesaurus.com taken at the time of writing. However, these advertisements were seen as intrusive because they were usually not relevant and clashed with the layout and content of the website. The use of these advertisements led to many users installing ad-block extensions to their Internet browsers that would hide these banner advertisements (Miroglio, Zeber, Kaye, & Weiss, 2018). Businesses began realizing that their advertisements were being rendered useless, and advertising companies knew that they had to adapt to the new technology.



While ad-block neutralized the effectiveness of banner advertisements, other technologies allowed for more innovative solutions to problems of traditional advertising. One issue that had to be addressed was the intrusiveness of advertisements. With the rise of on-demand streaming services, such as Hulu and YouTube, advertisements became integrated in between videos. Since these advertisements resembled commercials that would be shown on television, many people were used to them despite still being a nuisance. Unlike commercials, these video advertisements sometimes allowed users to skip the advertisement after a short period of time reducing people's frustration with the advertisement while giving the advertisement some exposure.

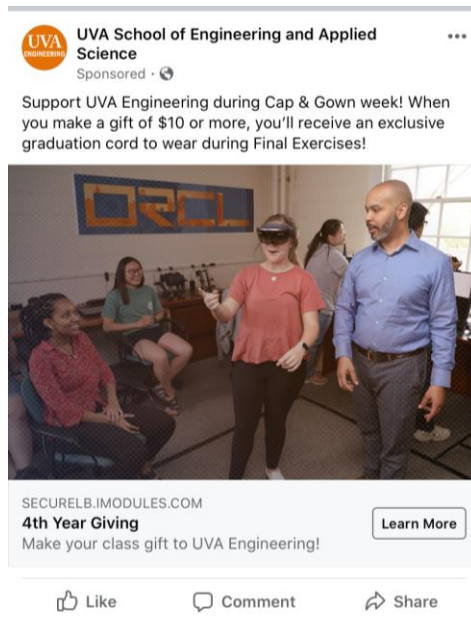
### **Mobile Advertisements**

The rise in mobile devices have also played a part in the decrease in banner advertisements. Banner advertisements took up a lot of real estate on small screens, so advertisers had to come up with a way to seamlessly integrate their advertisements rather than have them as an add-on to the main website. Online platforms have also begun developing dedicated mobile applications for their services in order to improve the user experience of their platform on mobile devices (Jobe, 2013). As a result, banner advertisements became more ineffective since less people used mobile versions of websites in favor of mobile applications.

In order to create more effective advertisements, marketers had to understand how people Internet. The introduction of mobile devices has changed the way that people consume media. Having a miniature computer in one's pocket has made it easier than ever to stay connected online and has become many people's go-to for short-term entertainment. Just as getting online has gotten easier, online media has gotten easier to consume. Most social media platforms use a feed layout, which is a list of all of a user's subscribed posts, typically in chronological order. This provides users with a never-ending list of content with just a swipe. This format encourages

passive consumption of media as users are presented with their desired content rather than searching out for content.

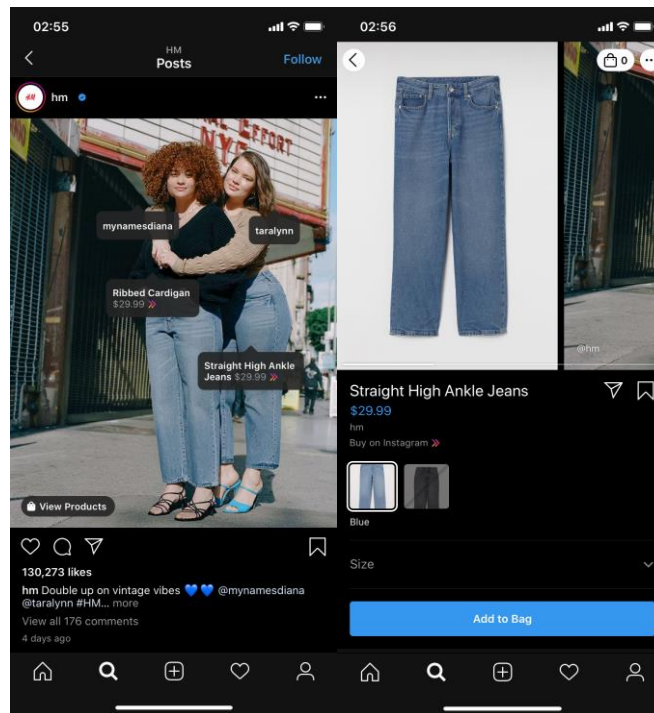
Given this knowledge about the way people use social media, advertisers began transitioning their advertisements to social media feeds.



A sponsored post from the UVA School of Engineering and Applied Science on a Facebook newsfeed. Retrieved from Facebook.com

These advertisements were more effective than banner advertisements because they were seamlessly integrated in a user's news feed. The advertisement is formatted in such a way that it looks like a typical post that a person would normally see on their feed, so that the user would not realize they were viewing an advertisement. Users are not as bothered by the advertisement as opposed to an intrusive banner advertisement because the next post is just a swipe away. As with any other Facebook post, users are able to like, comment, or share the advertisement. This allows users to interact with advertisements in ways that have not been previously possible with traditional advertising.

More recently, social media companies have implemented e-commerce features onto their mobile applications, reducing the gap between advertisement to check-out.



Left: An Instagram post by the clothing company “H&M” with its products tagged for purchase  
Right: The check-out page within the Instagram mobile application  
Retrieved from the @hm Instagram page

For example, Instagram has released a feature allowing businesses to tag their products allowing users to purchase their products straight from the mobile application. This shows that advertisements are following a trend of being subtler in the age of social media.

### **Social Media and Advertising Companies**

Online advertisements becoming subtler also serves as evidence of advertisers and social media companies working together towards a common goal. Since most social media companies follow an advertising-based business model, it is in their best interest to improve their advertising capabilities in order to attract advertisers on their platform (Srinivasan, 2019). In addition to e-commerce features, social media platforms have also added features to allow advertisers to target certain demographics that are more likely to buy their products. This is a

huge advantage that online advertisements have over traditional advertisements. Previously, the task of getting an advertisement in front of the right people was on the marketer to find the appropriate platform to advertise on. For instance, a men's deodorant advertisement would be likely to show up on an issue of Sports Illustrated because their readers are likely to participate in athletic activities. Online advertisers now only have to specify the type of person likely to buy their product and the social media platform takes care of broadcasting the advertisement to the right people. Online advertisements allows businesses to reach an audience far greater than the subscribers of a magazine as well as increase the chances of the advertisement reach the intended audience.

Online advertisements' ability to target certain users is the biggest reason why advertisers are taking advantage of social media platforms. Social media companies are in a unique position by having a large pool of users voluntarily giving up their personal data. This information makes it easier for social media platforms to target users with advertisements as well as analyze connections between user's interests and their personal information, such as age or ethnicity. For instance, Facebook can assume that a person may be interested in deodorant products if they are a member of a community sports team Facebook group. With people using social media for news, announcements, and entertainment, social media companies have plenty of information to make inferences on a person's interests.

Online platforms typically use "cookies" as a method of gathering information on users. A cookie is a small file downloaded onto a person's computer when they visit a website, which stores a unique hash mapped to a specific user. As the person browses a website, the website can store data on the user's behavior under their unique hash. When the person visits the website the next day, the website is able to read the person's cookie and look up the person's previous

actions. Cookies are how people can stay logged into a website even after closing the browser. The website reads the cookie, looks up the account mapped to the cookie's hash, and automatically logs the user into their account (Peacock, 2014).

A recent trend in online advertising has been the use of third-party cookies. These are cookies that are issued from a website other than the website being visited. As an example, Facebook can issue a third-party cookie for a business, like Amazon. Amazon now has a unique identifier for a Facebook user without the user ever visiting Amazon.com. As users browse Facebook, their online behavior is being sent to Amazon. The next time the user visits Amazon.com, they will be presented with product recommendations curated based on their Facebook actions. This explains why you start seeing Marriott advertisements after making a Google search for hotels.

### **Privacy Implications**

User tracking may be the biggest advantage of using online advertisements, but it is also the biggest concern among users. The use of third-party cookies makes it difficult for users to know what parties are tracking their data. Most Facebook users understand that Facebook uses their data to make advertisement recommendations. However, users usually do not know which third parties are tracking their Facebook usage unless they manually check their cookies. People view this practice as deceptive, which results in distrust towards social media companies.

There are other instances of social media companies sharing user data to third-parties beyond using cookies. In 2016, Facebook allowed Cambridge Analytica, a political consulting firm, to conduct a survey on their application on Facebook. Under Facebook's privacy policy, Cambridge Analytica was allowed to obtain the Facebook data of the users that used the application as long as it was used solely for academic purposes. However, Cambridge Analytica

was also able to access the data of all the users with a connection to the user who took the survey. Cambridge Analytica used this data to target users with Trump campaign advertisements. These advertisements were suspected of spreading Russian propaganda and targeting users that were more susceptible to misinformation (Cadwalladr, & Graham-Harrison, 2018).

In response to this scandal, the Federal Trade Commission (FTC) penalized Facebook with a \$5 billion fine for having deceptive privacy policies, mainly the feature that allows companies to collect data on friends of users that use the company's applications (Fair, 2019). This feature was considered deceptive by the FTC because Facebook does not have a privacy setting that allows for users to protect their data from being used by these kinds of applications. There was also not a clear indication that using an application would enable it to access a person's friends' data. In addition to the \$5 billion fine, Facebook was required to strengthen their policy towards third-party application developers as well as have an independent privacy committee overseeing Facebook's use of personal data.

The Facebook-Cambridge Analytica scandal is a prime example of why users and policymakers are concerned about their personal privacy on social media platforms. Most social media platforms have a privacy policy and/or options that allow users to pick and choose which of their information can be shared and to whom that information can be shared. However, this case shows that policies can be deceptive and unenforced. Because Facebook stores so much data on its users, a data breach could potentially affect billions of users. The chances of a data breach is multiplied when third-parties are given data access since their cybersecurity infrastructure is probably not as robust as Facebook's. There does not have to be a data breach for data to enter the wrong hands. In the case of Cambridge Analytica, there is suspicion that they collaborated directly with the Russian government to spread Russian propaganda. The

possibility of a foreign entity possessing data on millions of U.S. citizens is an extreme risk to homeland security.

### **Public Response to Data Tracking**

Even though this scandal exposed a glaring vulnerability in the eyes of the U.S. government, the reaction was not as strong by the public. Initially, there was public outcry towards Facebook about the mismanage of their data. Some people strengthened their privacy settings. Others deactivated their Facebook accounts altogether. However, most people made no change at all (Lapowsky, 2019). While the possibility of Russia possessing data on U.S. citizens represented a great risk to the government, there was not a sense of imminent risk felt by the public. The idea of Russia knowing a person's age and hometown is not a pressing issue for an average citizen as opposed to a hacker causing a data breach releasing everyone's account passwords, which could cause a lot more issues for an individual. The concern among the public is more focused on the user tracking by businesses because the effects are much more visible. Seeing an advertisement on Facebook of a product you were looking up previously may seem creepy to some people, but for most, the sentiment stops there. People have become so dependent on social media that the potential risks do not outweigh the benefits of having social media. People have become more aware of these advertising practices, but since most users tend to scroll through advertisements anyway, the potential risks do not cross people's minds. The infinite nature of social media content makes it infeasible for users to think critically about every post they read, so it is easy to ignore an advertisement.

Some users even view user tracking as a beneficial feature. It makes sense that users would prefer to be presented with relevant advertisements of products they may use in exchange for giving up their personal data. As self-centered as it may sound, people are more concerned

with benefitting their own lives rather than protecting the security of the country. Ideally, it is the social media company's responsibility to morally handle this data because they control who can access their platform's data.

### **The Technological Momentum of the Internet on Advertising**

The results of this research show that Internet usage has grown considerably and rapidly. This is a result of improved broadband access, increase in mobile devices, and the growth of social media platforms. These technological developments made it easier for people to get online as well as give more reasons for people to go online as the Internet becomes more intertwined in day-to-day life. This is the first phase of technological momentum when the technology acts as the driving force for societal change.

The increase in Internet users allowed advertising-based social media companies, such as Facebook and Google, to develop from small technology start-ups to multi-billion-dollar corporations. The popularity as well as the convenience of the Internet also made it easy for these companies to integrate themselves into society. Users use Facebook for everything from organizing events to selling personal goods. Towards the middle of the decade, Facebook and Google have become brand names among the public and have accumulated enough resources to begin establishing their hold among online platforms. This is the second phase of technological momentum when the institutions, the social media companies, have become established in society and becomes the driving force for technological development. As Facebook grows from their social media success, they reinvest in improvements for their business model. In Facebook's case, they develop technologies to improve the efficacy of their advertisements, such as third-party cookies and targeting algorithms.



## **Limitations**

The biggest limitation to this research is the access to data. While there are known methods of data tracking, such as third-party cookies, there are also multiple suspected ways that social media companies use to collect information on its users. For example, Facebook has been accused of listening in on mobile devices' microphones to collect data on people's interests (Tiffany, 2018). However, it is not possible to confirm without knowing the inner workings of the Facebook mobile application. There are also limitations to the validity of the data itself. Some academics have critiqued advertising efficacy data for having selection bias. A study conducted by Steve Tadelis, economics professor at UC Berkeley, showed that the number of sales did not significantly drop in the absence of Google search advertisements. This is because advertisements curated for people that are likely interested in a product were probably going to buy the product anyway (Frederik, & Martijn, 2019). The point of advertising is to reach people that are not yet interested in a product, who are often filtered out by the targeting algorithm. Despite these limitations, the potential privacy implications remain a risk.

## **Future Research**

This research paper presents a general overview of the changes in online advertising practices over a decade. Future research into this topic would require a deeper look into certain technologies, such as third-party cookies and advertisement targeting algorithms. This could possibly reveal methods of curating relevant advertisements while minimizing the amount of personal data needed. Another possible research angle could be analyzing these technologies from a legal and ethical angle. Not all social media companies have the same privacy policies, so it would be helpful to compare different privacy policies and analyze potential vulnerabilities as well as known threats.

## **Conclusion**

This research analyzes the technological factors that initiated a shift in online advertising practices, mainly improvements in Internet access, mobile devices, and online platforms. The profitability of social media's advertising-based business model seen from this change incentivized social media companies and advertisers to collaborate in the development for better advertising technologies, such as third-party cookies and targeted advertisements. These technologies present a potential privacy risks on users as personal data is exchanged between multiple different parties, lowering a person's control over their own data. While this is a major concern for the country as a whole, individuals are more likely to accept the risks in order to use social media. Individuals are unlikely to take action, so it is the government as well as the social media companies to prevent certain privacy risks in the best interests of its citizens and users.

## Works Cited

- Butt, A. (2020, January 11). 101 Mobile Marketing Statistics And Trends For 2020. Retrieved from <https://quoracreative.com/article/mobile-marketing-statistics>
- Cadwalladr, C., & Graham-Harrison, E. (2018). Revealed: 50 million Facebook profiles harvested for Cambridge Analytica in major data breach. *The Guardian*
- Fair, L. (2019, July 24). FTC's \$5 billion Facebook settlement: Record-breaking and history-making. Retrieved from <https://www.ftc.gov/news-events/blogs/business-blog/2019/07/ftcs-5-billion-facebook-settlement-record-breaking-history>
- Frederik, J., & Martijn, M. (2019, November 6). The new dot com bubble is here: it's called online advertising. Retrieved from <https://thecorrespondent.com/100/the-new-dot-com-bubble-is-here-its-called-online-advertising/13228924500-22d5fd24>
- FTC Imposes \$5 Billion Penalty and Sweeping New Privacy Restrictions on Facebook. (2019, July 25). Retrieved from <https://www.ftc.gov/news-events/press-releases/2019/07/ftc-imposes-5-billion-penalty-sweeping-new-privacy-restrictions>.
- Graham, M. (2019, May 7). Digital ad revenue in the US surpassed \$100 billion for the first time in 2018. Retrieved from <https://www.cnbc.com/2019/05/07/digital-ad-revenue-in-the-us-topped-100-billion-for-the-first-time.html>
- Hughes, T. P. (1994). Technological momentum. *Does technology drive history, 101*.
- Jobe, William. (2013). Native Apps Vs. Mobile Web Apps. *International Journal of Interactive Mobile Technologies (iJIM)* (pp. 27-32)
- Lapowsky, I. (2019, March 18). How Cambridge Analytica Sparked the Great Privacy Awakening. Retrieved from <https://www.wired.com/story/cambridge-analytica-facebook-privacy-awakening/>

- Miroglio, B., Zeber, D., Kaye, J., & Weiss, R. (2018, April). The effect of ad blocking on user engagement with the web. In Proceedings of the 2018 World Wide Web Conference (pp. 813-821).
- Newberry, C. (2019, October 17). How to Advertise on Facebook in 2020: The Definitive Facebook Ads Guide. Retrieved from <https://blog.hootsuite.com/how-to-advertise-on-facebook/>
- O'Flaherty, K. (2018, October 11). This Is Why People No Longer Trust Google And Facebook With Their Data. Retrieved from <https://www.forbes.com/sites/kateoflahertyuk/2018/10/10/this-is-why-people-no-longer-trust-google-and-facebook-with-their-data/#2bf0ebb44b09>.
- Oremus, W. (2018, April 27). It's Time to Stop Saying "If You're Not Paying, You're the Product". Retrieved from <https://slate.com/technology/2018/04/are-you-really-facebooks-product-the-history-of-a-dangerous-idea.html>
- Parietti, M. (2019, November 3). The World's Top 10 Tech Companies. Retrieved from <https://www.investopedia.com/articles/markets/030816/worlds-top-10-technology-companies-aapl-googl.asp>.
- Peacock, Sylvia E. "How web tracking changes user agency in the age of Big Data: The used user." *Big Data & Society* 1.2 (2014): 2053951714564228.
- Pensworth, L. (2019, July 22). Why Digital Media is Killing TV Advertising. Retrieved from <https://blog.hubspot.com/marketing/why-digital-media-is-killing-tv-advertising>
- Rainie, L. (2018, March 27). How Americans feel about social media and privacy. Retrieved from <https://www.pewresearch.org/fact-tank/2018/03/27/americans-complicated-feelings-about-social-media-in-an-era-of-privacy-concerns/>.

Roser, M., Ritchie, H., & Ortiz-Ospina, E. (2020). Internet. Retrieved from

<https://ourworldindata.org/internet>

Srinivasan, D. (2019, June 24). How Digital Advertising Markets Really Work. Retrieved from

<https://prospect.org/economy/digital-advertising-markets-really-work/>

Tiffany, K. (2018, December 28). The perennial debate about whether your phone is secretly

listening to you, explained. Retrieved from [https://www.vox.com/the-](https://www.vox.com/the-goods/2018/12/28/18158968/facebook-microphone-tapping-recording-instagram-ads)

[goods/2018/12/28/18158968/facebook-microphone-tapping-recording-instagram-ads](https://www.vox.com/the-goods/2018/12/28/18158968/facebook-microphone-tapping-recording-instagram-ads)

Villas-Boas, A. (2019, November 5). 'Red Dead Redemption 2' would have taken almost 48

hours to download a decade ago - here's how far internet speeds have come. Retrieved

from [https://www.businessinsider.com/internet-speeds-have-gotten-dramatically-faster-](https://www.businessinsider.com/internet-speeds-have-gotten-dramatically-faster-over-past-decade-2019-11)

[over-past-decade-2019-11](https://www.businessinsider.com/internet-speeds-have-gotten-dramatically-faster-over-past-decade-2019-11)