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**Samuel Havlíček**

**CHARLES UNIVERSITY**

**FACULTY OF SOCIAL SCIENCES**

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**The use of ad blocking tools in the Czech Republic  
and their economic implications**

Bachelor's Thesis

Author: Samuel Havlíček

Study programme: Economics and Finance

Supervisor: Mgr. Petr Polák, M.Sc., PhD.

Year of the defence: 2022

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Prague, August 2, 2022

Samuel Havlíček

## **Abstract**

This work focuses on the use of ad blocking tools in the Czech Republic and their wide-ranging implications for the digital advertising industry. As a part of this thesis, I conducted an online survey which collected the necessary information about the users of the Czech internet environment. The dataset consists of 206. The vast majority of respondents have a negative attitude towards advertising, but almost half of them are willing to display ads to support concrete websites. Respondents showed a strong willingness to pay for online content, which may ease any concerns publishers might have about whether they can take the bold step of changing the system of content monetization. Additionally, a significant number of respondents were unaware of the ability to block online ads, and the data suggests that there is great potential for ad blocking to increase in the future.

## **JEL classification**

E20, H20, H27, H31, H40, M30, M37

## **Keywords**

Ad blocking, Adblock, Advertisement, Paywall, Indirect payments, Ad banner, Mobile adblocking

## **Title**

The use of ad blocking tools in the Czech Republic and their economic implications

## **Abstrakt**

Tato práce se zaměřuje na používání nástrojů pro blokování reklamy v České republice a jejich rozsáhlé důsledky na průmysl digitální reklamy. V rámci této diplomové práce jsem provedl online průzkum, který shromáždil potřebné informace o uživatelích českého internetového prostředí. Dataset se skládá z 206 odpovědí. Naprostá většina respondentů má negativní vztah k reklamě, ale téměř polovina z nich je ochotna zobrazovat reklamy na podporu konkrétních webových stránek. Respondenti projevili velkou ochotu platit za online obsah, což může zklidnit případné obavy vydavatelů, zda mohou přistoupit k odvážnému kroku změnit typ zpeněžení obsahu. Značný počet respondentů navíc nevěděl o možnosti blokovat online reklamy a data naznačují, že existuje velký potenciál pro budoucí nárůst blokování reklam.

### **JEL klasifikace**

E20, H20, H27, H31, H40, M30, M37

### **Klíčová slova**

Blokování reklam, Adblock, Reklama, Paywall, Nepřímé platby, Reklamní banner, Mobilní blokování reklam

### **Název práce**

Používání nástrojů na blokování reklamy v České republice a jejich ekonomické dopady

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# List of Acronyms

5K	Five thousand
AFID	Association for internet development
CPC	Cost per click
CPE	Cost per engagement
CPM	Cost per mille
CPV	Cost per view
df	Degrees of freedom
DNS	Domain name system
HTML	Hypertext Markup Language
TV	Television
URL	Uniform Resource Locator
VPN	Virtual private network

# 1 Introduction

In the 20s century, the advertising sector experienced dramatic changes as new technologies were developed and consequently, new ways of communication started to be utilized. Soon they evolved into various mass media including radio and television. In more recent times, with the arrival of digital media, the opportunities have become even broader, and the time we spend online has gradually increased. We live in a world flooded with advertisements. Something that can only hardly be avoided. Each day we meet with various messages trying to promote or sell products, services, brands, and ideas. Companies spend billions of dollars each year to achieve this, and overall, they compete in a colossal contest for our attention.

It was not the case at the beginning of the internet, but the potential was soon realized, and in the year 1994 the first banner ads were created. (McCambley, 2013) Over time, more and more websites decided to use this new source of income, and some decided to make it their primary business model. Over the course of time, types of online advertisements appeared, and their numbers grew to enormous dimensions. It did not take long for the cup to fill up and in the year 1996, the very first ad blocker was created by a small company called PrivNet. It was named Internet Fast Forward<sup>1</sup> and was able to block ads and cookies. However, after its acquisition in the same year, the product was discontinued due to lawsuit concerns. (Bagirov, 2020) Back then, the functions were highly limited, but it was the beginning of a long ongoing battle between the online advertising industry and creators of adblocking tools. At first, adblocking was not adopted by a significant amount of internet users, but in recent years the rapid growth of adblocking poses an existential threat to websites relying on online advertising. It is estimated that the average global adblocking rate in recent years ranges between 25%-50%. Led mainly by countries from Asia like India and Indonesia, where adblocking solutions are built-in popular web browsers. The exact number is hard to obtain as the computations rely on various methodologies and some adblockers try to conceal themselves from detection, but a report from PageFair (Goveo, 2021) estimated that there were more than 840 million devices globally blocking ads at the end of 2020 and the number is growing each year. From the total number of adblocking

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<sup>1</sup> <https://www.youtube.com/watch?v=dOS0Bl4orJ8> example of a TV commercial for this program.

devices, they estimated that 69% of global adblocking is happening on mobile devices.

The reasons behind users' decision to instal tools blocking ads vary. The primary reasons for many are distraction of advertisements, invasive pop-ups, disruption of websites in terms of functionality and visibility of elements, speeding up webpage load time, an overwhelming number of ads and nowadays even protection from fraudulent ads and malvertising.<sup>2</sup> The secondary reasons are unethical content in ads, saving data and bandwidth (mainly mobile devices), battery saving, privacy protection, protecting children from seeing inappropriate content and making pages easier to read. On the other hand, there are also some disadvantages which are associated with the use of adblockers. From a user's perspective, most notably, some websites may become unusable or corrupt, as the tool may block not only annoying ads but also some essential website features, such as shopping carts, customer support, or an entire text element. Moreover, some websites are trying to fight back and detect whether the user is blocking advertisements. If they recognize such behaviour, they often try to prevent that user from accessing the website (and sometimes ask to pay a subscription) or display a notification and ask for whitelisting of the website.

Adblocking is effectively disrupting the web ecosystem and it causes significant revenue loss for websites running advertisements. If the adoption of ad-blocking tools is going to continue, then we may soon see some websites shutting down, changing their business model, or putting more power in the fight against adblocking instead of using it to generate qualitative content.

The overall situation is nowadays getting very complicated as the conflict reaches new levels. Developers of adblockers are adding new countermeasures in retaliation for blocked websites, including those that prevent the website from loading control scripts that verify whether a user is using an adblocker. This can be described as an anti-antiadblocker. Further escalation is also done by some websites which try to serve the ads again if they were blocked at first try or repeatedly refresh webpage elements. It would be far beyond the scope of this thesis to comprehensively describe the full extent of the conflict between the advertising industry and adblockers, but further escalation can be expected to come in the future.

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<sup>2</sup> Attack utilizing advertising networks to spread malware

In a broader perspective, the issue with online advertising and adblocking is a complex question. It poses many moral dilemmas while not all members of each side behave the same. One may question himself whether it is acceptable to use adblocking tools at all. If yes, then what should be blocked and what not? Whether it is justifiable that some companies behind adblocking tools earn money by not blocking ads in default for selected websites. Last but not least is the morality of excessive user data collection and ad targeting.

The adblocking issue today has grown into massive dimensions and has become an important topic for both the advertising industry and publishers. In the academic sphere, it also did not escape attention and already, a decent amount of academic work was written about adblocking tools and their usage. Many of the works focus on a technical or behavioural rather than an economic perspective. In the case of the Czech Republic, there is only a limited amount of data available about the usage of adblocking tools, and many important questions still remain unanswered. Therefore with this thesis, I would like to further enhance the public knowledge about the adblocking issue by providing a valuable summary of accessible resources combined with my own research, including an evaluation of a survey released to the public in the Czech Republic.

My aim is to contribute to the existing research by addressing questions not yet or partially answered, such as: What is the willingness of Czech users to pay for internet content? What is the reaction of users to anti-adblocking measures implemented? In addition, thanks to the data collected via survey, I would like to investigate various relationships across factors relating to the adblocking issue. For the second part of this thesis, I would like to discuss the results and derive some information on what the use of adblocking tools can cause to the Czech digital market and associated advertisement sector. Moreover, I would like to discuss the potential effectiveness of various solutions to the adblocking problem, including an analysis of willingness to pay for the removal of ad content from the internet or individual websites and analyze the overall perception of ads by respondents, including the willingness to allow for some less intrusive advertisements to be shown.

The rest of this work is organized in the following way: (1) Literature review, (2) Survey, (3) Economic implications (4) Conclusion.

## 2 Literature review

The issue of ad blocking has already been captured in a broad spectrum of academic literature. As a broad topic, it can be approached from various viewpoints. For a better understanding of the topic, the next subchapters also try briefly to summarise the basics of adblocking. This chapter is divided into four parts. The first subsection describes the main functionality and work of ad blocking tools with examples of different approaches that currently exist. The following section focuses on the problem from the side of the advertising industry and publishers. The third part describes a slice of the arms race between the two sides. Finally, the fourth subsection describes the matter from the economic point of view and analyses the literature for estimated economic consequences of using an adblocking tool.

### 2.1 Adblocking and its functions

The ad-blocking software is a tool capable of preventing online advertisements from being displayed to the user. It can work within a web browser, application, entire device or on a network level. In most cases, it is a browser extension or external program, but other methods exist, such as host file and DNS manipulation, DNS filtering, Filtering through Local VPN or even through proxies run by internet providers and mobile operators. More tech-savvy persons can deploy PiHole (PiHole, 2022), which by utilizing a DNS sinkhole, removes ads for all connected devices (including smart TVs) on a network-wide level like small households.

Traditional ad-blocking tools such as Adblock rely on the use of filter lists which contain a list of known ad servers and ad locations. The most well-known filter list, EasyList, is open source and crowdsourced. (Storey *et al.*, 2017) To create and maintain these lists up to date requires an enormous amount of human effort as it is simply a whack-a-mole approach. They contain a collection of expressions like URLs or specific elements on web pages which are intended to get blocked. They can also block images with a standardized size of banner ad or focus on elements with ad disclosures such as "Sponsored". The ad-blocking tool reads all the filter lists each time a user visits some web page and applies all the rules to webpage requests. URL (domain) requests that match a rule are blocked, and the requested content is not loaded. Element hiding rules are applied after rendering the webpage, and this time all matching elements are hidden after loading.

The overall effectiveness of traditional ad-blocking tools depends on how complete and actual the used filters are. Users can reach higher effectiveness by adding more filters but at the cost of slightly slowing down the loading time of web pages. There are also language-specific filter lists to which users can subscribe to gain better protection from ads based on their country. Notably, adblockers can also employ additional lists like privacy filter lists to block online tracking, social media widgets or other various annoyances. Thus, effectively allowing the user to sort out unwanted content from loading or being displayed.

In addition to the traditional approach, there are other ways to block online advertising. Storey *et al.* (2017) proposed a new method called perceptual adblocking, which uses optical character or image recognition to identify and remove ad content from the webpage. They claim that this method is more resilient against code obfuscation and heavily reduces human effort in comparison to keeping filter lists actual. However, Tramèr *et al.* (2019) disputed the usability of perceptual adblocking as they managed to circumvent the detection using various web page markup obstacles and HTML obfuscation of ad-disclosures (for example, fragmenting images). They argued that while this method might be able to end a current arms race, it may, on the other hand simply replace it with another one where ad-blockers will be under direct attacks to the visual classifier. Din *et al.* (2019) developed a perceptual image-based ad blocker called Percival with the ability to replicate EasyList with 96.76% accuracy, but in conclusion, they regarded the tool only as a viable complement to traditional adblocking. Storey *et al.* (2017) also mention other theoretical methods which might be used in the future, but the current mainstream is a cat-and-mouse game to keep filters constantly up to date.

For the Czech Republic, there is only a limited amount of population-wide research about the actual prevalence of ad blocking tools. Komárek (2015), during his research, found that experts from various fields connected to online advertising estimated the pageviews with activated ad-blocking tools to be around 16-25%. Association for Internet Development (SPIR, 2018), an important player on the Czech advertising scene, reported in their announcement from the year 2018 that according to their long-term structural research conducted twice per year, the share of users blocking online advertisements has remained below 20% in the last three years.

## 2.2 Digital advertising industry

The digital advertising industry is a global, multibillion-dollar business. It connects producers with consumers inside an online environment, and there are various forms of online advertising as well as a wide range of payment methods for advertisement delivery. Ads can be encountered as banners, promoted search results, videos, animations, emails, native advertising etc. In terms of participating parties, we can speak about two main parties: the website visitors who browse the internet and publishers who make their content available online and provide ad space. The other participating parties are advertisers (sometimes called buyers) who want to reach audience of visitors, advertising and marketing agencies and ad servers, which serve as ad providers and intermediaries between advertisers and publishers. Sometimes the agency and ad provider can be the same firm. Advertisers have the choice to approach agencies to prepare and launch the advertising campaigns for them, or in some cases, advertisers can create ad content by themselves. This is most likely the case for larger companies which have their own marketing department. Regardless of who created the ad content, advertisements can be delivered to visitors either directly through publishers or indirectly via ad servers which then send them to individual publishers. In which way depends on many variables. The existence of a massive market of third-party ad servers is supported by the fact that many publishers do not want to sell ad space directly to advertisers and instead prefer them automatically delivered through an ad server. (Kokemuller, 2014) The additional supporting fact is that sometimes small advertisers are not able or not in a good position to serve their own ads. Therefore, we have first- and third-party advertising.

The first-party ads are those which are delivered directly from the publishers' own domain without an ad server. Facebook, as one of the largest publishers, is a good example. The third-party advertisements are on the other hand delivered to a publisher through an ad server. In practice, visitor first loads the webpage and then ads are requested from separate ad servers. Most of the ads encountered on smaller websites are third-party ads. As described in the previous subchapter, the adblocking tools are capable of blocking the requests to ad servers by denying particular DNS requests. To combat first-party ads, adblocking tools need to employ element hiding rules, but at first, the ad content is still loaded and then hidden. Therefore, they are causing additional harm to the advertising industry as some pricing models rely on a number of displays to visitors and in the case of



element hiding, it can still be counted as a view if not detected by an additional script.

An important measure for advertisers is naturally the price paid for ads. The cost of an ad is determined by its format, webpage location, pricing model and quality of the ad content connected to relevancy. The most prevalent pricing models are performance-based, for example, CPC (Cost per click) or CPE (Cost per engagement), but other like CPM (Cost per impression) and CPV (Cost per view) are also commonly used depending on the market conditions and campaign target. (Asdemir, 2012) Large ad servers like Google's AdWords or Facebook utilize ad auctions to determine the best ad to show to a person at a given point of time. The lightning-fast auction is run each time there is an opportunity to show an ad to someone. (Facebook, n.d.) In some auctions, the price can reach very high levels if the content is very specific and the demand is high. In the case of advertisers running ads in the CPC/CPE regime, the advertisers are not harmed by visitors using ad blocking tools because the ad is not even loaded and therefore cannot be clicked. The only suffering party here is the publisher, who provides his content without being compensated for it. This is not the case for CPM or CPV regimes with first-party ads because this time, the only harmed party is the advertiser who is paying for nothing, and the publisher is still getting his pay for the ad display. This happens unless there are some scripts that verify whether the ads were properly displayed – often used by Google, but even those can sometimes be blocked. The struggle is even more complicated with more advanced adblocking tools that load all the ad content and hide ads with delay to remain invisible to ad blocking detection.

### **2.3 Adblocking and counter-blocking**

With the increasing popularity of ad blocking tools, the threat to the stream of income from advertising intensifies. In response, some publishers have adopted mechanisms for detecting and counter-blocking adblockers. Anti-adblocking scripts at first try to detect the presence of ad blocking tools and then inform the user with a warning message in which the website usually asks the visitor to either turn off the adblocking tool or whitelist the webpage and often also subscribe to some form of website membership. In some cases, this request is only optional and can be closed, but sometimes the website strictly does not allow visitors to view content.

The developers of adblocking tools have reacted to that with countermeasures in an effort to detect anti-adblockers and counter-block them. Effectively we can speak about anti-anti-adblocking. Usually, this is done by blocking the JavaScript used to detect adblocking, blocking the pop-up warning messages or avoiding detection by trying to conceal its functioning. Nithyanand *et al.* (2016) found that there are plenty of entities providing anti-adblocking scripts (solutions) to websites, and already in the year 2016, they observed that 6.7% of the top five thousand most visited websites in Alexa Traffic Rank are using anti-adblocking scripts. Only one year later, Iqbal *et al.* (2017) found that this number has increased to 9% of the top 5K websites on Alexa ranking. It can be assumed that today this number will be higher. Moreover, Nithyanand *et al.* (2016), in their research, discovered that the distribution of anti-adblocking websites varied across website categories. General News deployed these scripts by about 19.5%, while Technical/Business forums only by 2.2%.

The arms race continuously escalates as each of the sides tries to gain an advantage over the other. It is out of the scope of this thesis to describe the full extent of the conflict comprehensively, but the ad-blocking scene has been changing over time, and it can be expected to continue in the future. Storey *et al.* (2017) pointed out one key observation for the future that even though publishers effortlessly try to combat adblocking with new countermeasures, scripts, obfuscations etc., the ad blockers always run at a higher privilege level than such codes and hence are in great advantage in this conflict.

## 2.4 Economic perspective of adblocking

Online advertising is one of the main driving factors of today's internet environment. Many websites depend on the income generated by monetization of user visits and disrupting that flow of money exposes them to an existential threat. Online publishers are suffering a loss of billions of dollars in advertising revenues due to adblocking (Marshal, 2016), and with further expansion of adblocking tools, the loss will be even greater. Publishers are reacting to this situation in many ways, and as discussed in the previous subsection, many of them try to retaliate. However, many of the current attempts to punish ad-blocking users are very short-term and putting energy into a fight with adblockers redirects energy from content creation and thus also indirectly affects non-adblocking visitors.

Ad blocking has an apparent, direct positive effect on most consumers who consider ads in general as something negative. Gritckevich *et al.* (2021) created a model through which they explored the net impact of ad blocking on all visitors (consumers). The results showed that under a broad set of market conditions, the total consumer surplus and even total welfare decline under ad blocking. They showed that some users are always better off with an ad-blocking tool, but for an average user, the decrease in content quality is larger loss than the gain from ad reduction. However, it can be disputed whether this decrease in total welfare would persist after the market adapts to the new conditions.

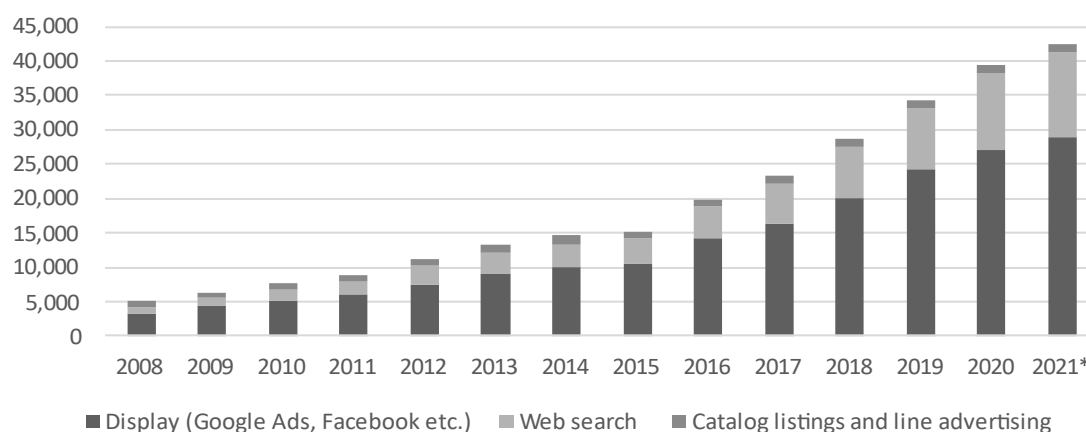
Publishers are aware of the current development, and some of them have already chosen to escape the adblocking threat by changing their business model and stop relying solely on income from advertising. There are basically three main alternative business models used by publishers around the world today to gain income from paid content. (Jetmar, 2020) The first is referred to as a metered paywall. This model allows users to enjoy a certain amount of content for free within a given period and then for additional content, users must pay or wait until the quota is refreshed. This model is, for example, used by prominent American media such as The Washington Post, which allows its users to read only few articles per month. The second model, called a hard paywall, makes all content available only to subscribers. This option is viable only for reputable publishers with unique content as it leads to the loss of all visitors desiring to view the content for free. In the third model, called freemium, some content is accessible for free, and the remaining part is accessible again only to subscribers. Among Czech online media, many freemium and hard paywalls have been implemented in the last years. Sometimes with a combination of free version including ads and multiple levels of subscription options, as is the case with Denik.cz.

Alternatively, there is a controversial possibility of regaining some of the lost income by entering the Acceptable ads program created by the company Eyeo GmbH. The management of this program has been transferred to the independent Acceptable Ads Committee, but Eyeo is still the one collecting commissions. Eyeo is a parent company of four popular ad-blocking tools: AdBlock, Adblock Plus, Ublock (not to be confused with Ublock Origin) and Crystal Adblock. Together, these four ad blockers have 225 million active users (Leinweber, 2021) on both mobile and desktop. By adhering to the Acceptable Ads standard, publishers can get on a special whitelist to have their ads displayed to users who have not opted

out of the Acceptable Ads program, which is by default turned on when downloading these adblockers. Large entities must pay a commission out of the ad revenue to get whitelisted, but smaller publishers are added for free. It is known that Google is a member of the program, but after a simple inspection of the exception rules list,<sup>3</sup> it is clear that an enormous amount of Czech websites and companies are also part of the list. Among the biggest: Seznam, Idnes and Blesk.

When speaking about the forgone revenue for publishers, the data availability for the Czech republic is very limited, but to some extent, the Association for internet development is making some of its datasets available. In the table below, there is a visible clear upward trend in overall advertising spending in the Czech digital market. In 2020, the biggest part of the budget was spent on display advertising, totalling 27 billion Czech crowns, with a projection of a 7 % increase to 28.9 billion for the year 2021.

Figure 1 Digital advertising budget share in Czechia 2008-2021, by format (in millions of CZK)



Source: Association of internet development (2022)

<sup>3</sup> <https://easylis/downloads.adblockplus.org/exceptionrules.txt>

## 3 Survey

This part of the thesis is devoted to the description of a survey released to the public. The main reason for conducting this survey was to collect necessary data on the Czech Republic because of the limited availability from other sources. Additionally, to gain insight into how the Czech internet users think about the issues connected to adblocking and what their reaction is to current anti-adblocking countermeasures. The quantitative approach was chosen as many of the desired questions were primarily suitable for a large audience with the possibility to formulate them as closed questions. The objectives of the investigation can be divided into multiple thematic units with an initial split on adblocking and non-adblocking users. The key part is focused on the willingness of internet users to pay for online content.

### 3.1 Methodology of the questionnaire survey

The survey about the internet users was based on previous knowledge and interest in the topic with further adjustments during the work and data collection. The research was conducted via the online survey tool Vyplnto.cz. The online survey technique was selected because the survey was targeted only at internet users, and this method provides a convenient option to collect responses anonymously. Additionally, the advantage of this online questionnaire is the possibility to create splitting questions and divide the respondents into branches according to their previous responses. Thanks to this functionality, the survey remained relatively short for respondents and comprised in total of 20 questions with three splitting points.

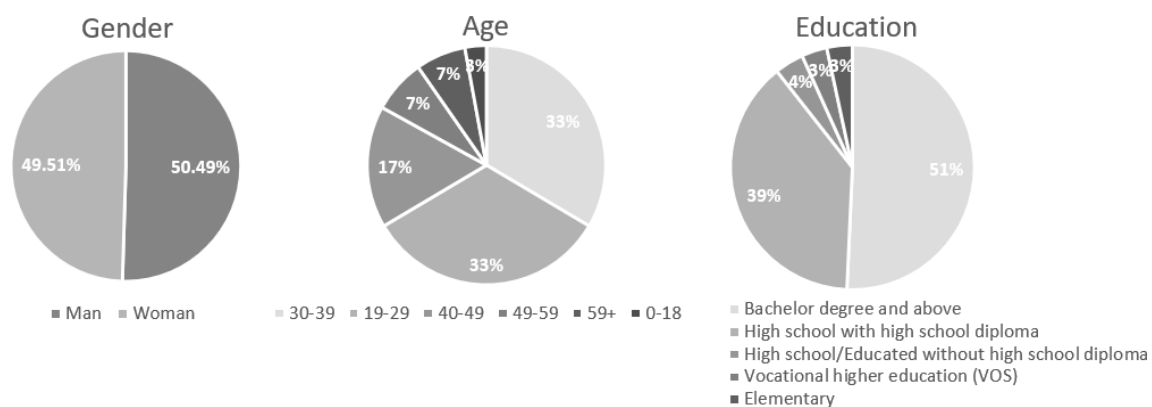
The targeted population, as mentioned, was the whole internet population in the Czech Republic. The survey was not propagated by any paid service as this would create bias in the data, and the vast majority of respondents are those who naturally came from Vyplnto.cz server. In total, the survey collected 207 responses, where one had to be deleted as it was evidently an unserious response leaving 206 for further processing. According to the Association for Internet Development<sup>4</sup> (SPIR,

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<sup>4</sup> SPIR represents the most important players in the Czech internet economy from among publishers, media agencies and technology companies

2022), there are 8,1 million internet users in the Czech Republic older than ten years. To verify if the gathered responses representatively reflect the true population, the survey contained four demographical questions. The respondents were asked about their gender, age, education, and region in which they primarily live. In the graph below it is visible that both sexes are equally represented, which is in line with the data of AFID about internet users. For the other three metrics, the collected data show deviations from the population parameters. This may be caused by several factors, but the most probable reason is that users of Vyplnto.cz, in general, do not fully represent the population and form a subset of the population. However, these deviations do not entirely invalidate the data as the sample collected is sufficiently diverse and, to a limited extent, approximates the population; thus, it can be at least partially used for deriving some information.

Figure 2 Demographic data of respondents



Source: Own work

## 3.2 Evaluation of individual questions

This subchapter is devoted to the evaluation of the questionnaire survey. The first part addresses the overall attitude of the internet users toward advertising and the awareness of the users about the option to block the advertisements. The next part talks about the group of users who are not using ad blocking tools. The third section examines the proportion of respondents using ad blocking tools and the last section analyses questions about willingness to pay for Internet content.

### 3.2.1 Attitude towards online advertising and usage of ad blocking tools

The first question of the survey asked the respondents what their overall attitude towards internet advertising is. Out of the 206 respondents, only 28 people responded that their attitude is non-negative. The exact numbers are summarised

in the table below. There is no clear distribution pattern, but as can be logically expected, the majority is taking a negative attitude, with a full 30 % having very negative.

In the next question, respondents were asked whether they use an ad-blocking tool on their personal computer or laptop. Unexpectedly, 144 (69,9 %) of them said yes, 58 (28,2 %) said no and 4 were unsure. This large share of ad blocking respondents is far above the estimates mentioned in the second chapter and presumably do not represent the true value. It is likely that respondents selectively decided to fill this survey from the public lists thanks to their interest in this topic. Moreover, in comparison to the real Czech population, the sample contains a larger proportion of people with university degrees who may be more informed about the option to avoid ads.

Table 1 Attitudes of respondents towards advertising

Attitude	Count	Percentage	Attitude	Count	Percentage
Very negative	62	30,1 %	Rather positive	2	0,97 %
Negative	54	26,21 %	Positive	2	0,97 %
Rather negative	62	30,1 %	Very positive	1	0,49 %
Neutral	22	10,68 %	Indifferent	1	0,49 %

Of the respondents that have negative (all kinds) attitudes towards online advertising, 73,6 % (131) of them answered that they use ad-blocking tools, while only 46,4 % (13) of respondents with non-negative attitudes do so. However, under the chi-square test, this result turned out to be not statistically significant ( $1,707 < 3,8$ ), that negative attitudes influence ad blocker usage in this sample. It also reveals that even people with a neutral attitude towards ad blocking tend to block ads. The possible explanation is that there are too many intrusive or annoying ads which push people that would normally not block ads toward ad blocking. From the reasons, which will be analyzed later, they mostly stated the disruptiveness of ads, pop-ups and coverage of content.

After the second question, respondents were divided into two separate groups based on their answers. The non-adblocking group was then given the question whether they knew that such ad-blocking tools exist and are available for free. 60 % (37) of them answered yes, and 40 % (25) no. Given that these tools have been around for more than two decades, and their prevalence is on the rise it is surprising to find out that there are still many people who are not aware of this possibility. If we

consider by taking the middle value from recent estimates that 80 % of Czech internet users currently do not use ad-blocking tools, it would mean that there are possibly still 32 % of them unaware when exaggerated. However, given the sample, this number is likely to be even higher.

### 3.2.2 Non-adblocking users

Out of curiosity, those unaware people were given question whether, after considering of consequences and moral aspects, they would instal such a tool. 44 % (11) responded that they are thinking about it, but 40 % (10) straight answered yes while only 16 % (4) said no. This finding shows the unmaterialized potential of ad blocking tools to hit the online advertising industry in the future after more people realize that this option exists.

The other part of aware respondents was instead asked about the reason why they do not use an ad blocker. The results can be found below in table 2. A large proportion of non-adblocking users stated they do not mind advertising or ignore it (37,84 %), and a smaller proportion of 21,62 % do not think it is fair to publishers. Surprisingly, the share of users who care about publishers is not larger, but given the size of the subsample, it full fills rather suggestive information.

Table 2 Reasons why respondents do not use adblocker

Response	Count	Percentage	Response	Count	Percentage
I do not mind advertising/Ignore it	14	37,84 %	Out of laziness	3	8,11 %
I do not think it is fair to website operators who get income from advertising.	8	21,62 %	Some websites were not working	1	2,7 %
I am not technically proficient for this	6	16,22 %	Other	1	2,7 %
I want advertising - (meeting the standard, not very invasive)	3	8,11 %			

### 3.2.3 Desktop ad blocking and reaction to countermeasures

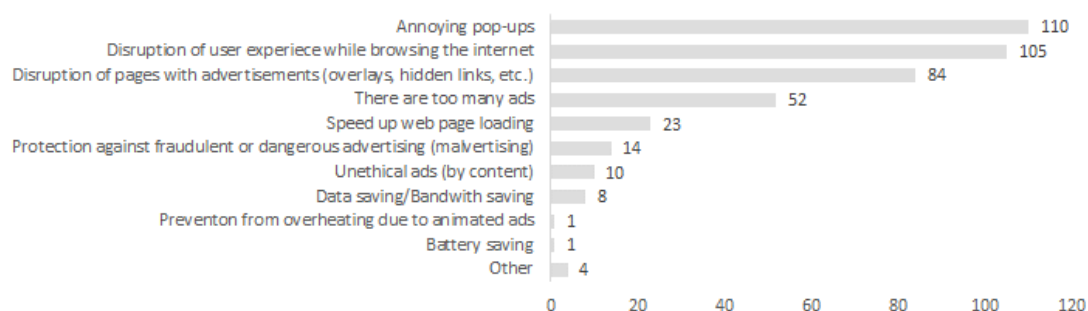
This subsection returns to the initial split of respondents to adblocking and non-adblocking users and focuses on those who block ads. In the following question, respondents were asked about the specific tool they use. This question was not mandatory, but it was answered by 141 out of 144 ad blocking respondents. Not surprisingly, the most widely used tool came out to be AdBlock with 61 % (86),



followed by Adblock Plus with 27.7 % (39). Both of them are now owned by Eyeo and are known to be the most popular. 20,57% (29) of the users reported using browsers with integrated adblocking solutions, and additional 17 % stated uBlock Origin. Many of the respondents reported using two or more ad blocking solutions at once, like a combination of a privacy browser with additional extensions. Some of them added that they also edit their DNS host files or block scripts.

The next question asked respondents about their primary reason for blocking ads. It was possible to select up to three most important answers with the option to write additional in the open field. More than 76 % stated that their primary reason for blocking ads were annoying pop-ups. This is a similar result as found by Komarek (2016), where more than 90 % of respondents stated the aggressiveness of ads. Other works, namely Kopsova (2019), found the most important reason number of ads. The difference between results might lie in the different or limited selection of answers to choose from.

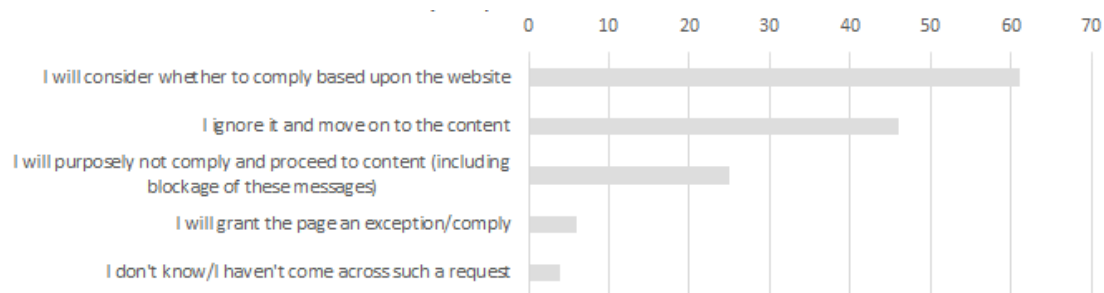
Figure 3 Main reasons for ad blocking



Among other key reasons, respondents selected disruption of user experience (72.9 %), disruption of the webpage content (58.3 %) and too many ads (36,1 %).

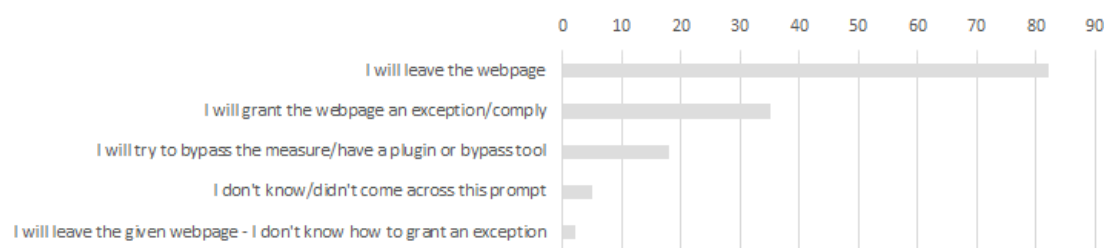
The following two questions focused on the reaction of users to website requests/appeals to turn off ad blocking tool or retaliation attempt to prevent a user from accessing the webpage without turning off the ad blocker or whitelisting. Both questions asked for the most frequent reaction to such prompts. In the voluntary case, nearly 43 % (61) respondents stated they would consider the request based upon the given website and possibly grant an exception or temporarily turn off, 32,4 % (46) would ignore it and move on to the content, 17,4 % (25) would purposely not comply and proceed to the content. This word was purposely used with the intention to reveal whether the users are strictly against ads and hold to their stated attitude in the first question.

Figure 4 Reaction to voluntary request to turn off ad blocker



In the second case, when users cannot access the webpage without turning off the adblocker, the situation turned against the publisher in comparison to the voluntary situation as 57,8 % (82) of respondents stated they would leave the webpage and 12,68 % (18) would try to bypass the countermeasure. A minority of 24,6 % (35) would, however, comply or grant an exception. Only 3,5 % (5) of respondents either do not know or did not come across such a prompt. The remaining two would leave as they do not know how to grant an exception.

Figure 5 Reaction to mandatory request to turn off ad blocker



The last question in this subsection looked at the willingness of users to allow some non-invasive ads to appear under compliance to a certain standard. This option is, for example, available on the most favourite ad blocking solutions, Adblock and Adblock Plus, as mentioned in the second chapter (2.4), and a majority of respondents are using those extensions. The option itself is voluntary, but mostly it comes turned on from installation. The purpose of this question was to investigate the relationship between respondents' attitude to ads and their willingness to see non-invasive advertising. Additionally, to verify the claim by Adblock Plus (2022), which supports the Acceptable Ads program. On their webpage, they state that 83 % of Adblock Plus users do not mind seeing Acceptable Ads. This is particularly important as large companies pay an undisclosed amount of money to be on the

allowance list. This question was added later and was not mandatory, so only 67 responses were collected.

In this subsample, 52,2 % (35) answered no, 20,9 % (14) do not know, 17,9 % (12) think their ad blocking tools do not support such function, and 8,9 % (6) stated yes. This is an interesting discovery as it does not correspond to the claim stated by Adblock Plus, and at least within this sample, it could be said that they provide very misleading information about the participation of users in the program. The study they refer to was conducted in the US, so one explanation possibly lies in the geographical differences, but in any case, they should rather clearly state the true percentage of users who participate in the Acceptable ads program instead of using the phrase "do not mind".

Notably, 50 % (6) of respondents who answered that their tool does not support such a function were using only Adblock or Adblock Plus and thus were incorrect. It is then possible that they have this feature enabled without their knowledge.

### **3.2.4 Mobile adblocking**

To investigate the current situation on mobile devices, the questionnaire included a question about the usage of adblocking tools on their personal telephone or tablet. Out of all 206 respondents, 30,6 % (63) stated they do block ads on their mobile or tablet, 55,8 % (115) don't, and 9,71 % (20) responded they do not have a mobile device to access the internet. (Remaining eight people were unsure) This number is twice bigger than what was found by Kopsová (2019) in her work from 2019. It is possible that the share has risen over the past years because of the broader availability of adblocking tools for mobile devices and increased awareness.

The additional question asked respondents about the name of such tool, and again the most popular ad-blocking solution showed up to be AdBlock (41,9 % - 26) together with integrated adblockers in browsers (also 41,9 % - 26). The most favourite desktop ad blocker Adblock Plus was left behind with only 12,9 % (8), and the remaining tools were used only by one or two individuals.

Of the total, 30,1 % (62) block advertising on both mobile devices and desktop/notebooks, and only one of the respondents uses the option to block advertising on a mobile device and not on a PC.

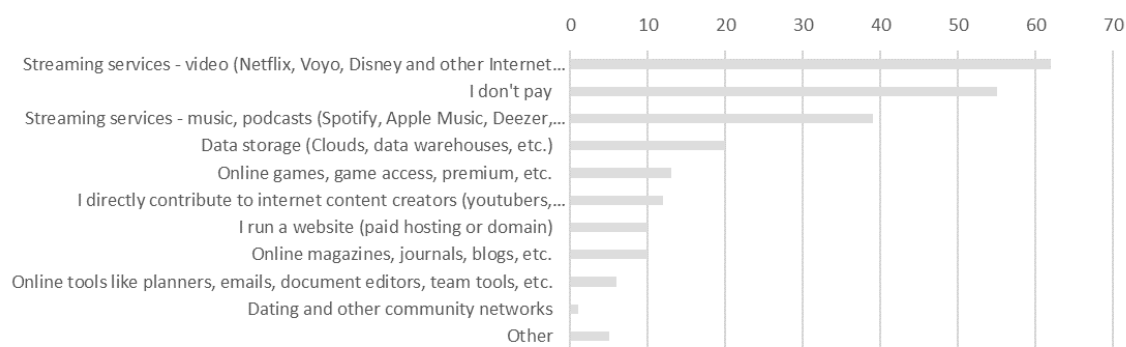
### **3.2.5 Willingness to pay**

In this subsection, respondents were given three questions relating to their willingness to pay for internet content. The intention behind those questions was to investigate the current situation and try to shed light on possible near future situation when adblockers would be widely used, and most of the publishers would be forced to look for another source of financing.

The first question asked the respondents whether they were paying for an internet subscription on any news website. The vast majority of 88,35 % (182) do not pay, but the remaining 11,65 % (24) still form a solid number of subscribers; however, deeper data inspection revealed that 71 % of paying readers have at least Bachelor's degree, and the remaining part of 29 % finished high school with maturita (a form of high school diploma in the Czech Republic). According to the Czech statistical office (ČSÚ, 2022), the share of citizens with tertiary education is currently 18,7 % (compared to 51 % of respondents). Thus the real percentage of the entire population will probably be considerably lower.

The next question was very similar, but this time it asked about paying for any other internet content or contribution to the creation of internet content. Due to later addition, it was filled only by 144 respondents. The results are shown in the graph below.

Figure 6 Payments for internet services or contributions to the creation of internet content



This outcome brings hope for the potential situation when ad blocking would be widely adopted as the majority of the users answered that they pay for internet services or support in some form creation of internet content. Only 38,2 % (55) stated they do not pay. Among the most popular were video streaming services (43,1 %), music/podcast streaming services (27,1 %) and data storage (13,9 %).

In the last question (disregarding the demographical), respondents were asked a complicated question. The full wording was as follows: If there was an opportunity to get rid of the vast majority of internet advertising through a monthly fee, how much would you be willing to pay for this service at most per month? Write zero, if any. (Part of the money would be distributed to the+ websites in proportion to the time spent)

The idea for this question comes from an internet project called The Scroll<sup>5</sup> which did the same thing with a hundreds of websites. However, this service did not last very long because it was acquired by Twitter last year and "temporarily" put out of service. The intention behind this question was to reveal the general willingness to pay for an ad-free experience on most of the internet and compare it with respondents' overall attitude toward advertising. Nearly half of the respondents, 48,1 % (99), would not be willing to pay a single crown to enjoy an ad-free experience, but the remaining majority stated a positive number. The maximum number was 1000 Kč<sup>6</sup> (approximately 40 euros these days) with an average of 50 Kč (2 euros). The Scroll monthly payment at its time was five dollars which in today's exchange rate would be around 120 Kč. Only 10,7 % (22) people from respondents would be willing to buy a subscription for such a price. However, there were 14,8 % (29) people willing to pay 100 Kč and possibly some of those would also be willing to accept the price as well. However, in comparison to today's cost of online subscriptions of Czech digital newspapers, it probably will not be a sufficient amount to unlock the premium content, but rather only to remove ads from freemium content.

Table 3 Average willingness to pay for ad-free experience given the attitude

Attitude	Average willingness to pay	Attitude	Average willingness to pay
Very negative	32 Kč	Rather positive	40 Kč
Negative	62 Kč	Positive	140 Kč
Rather negative	49 Kč	Very positive	10 Kč
Neutral	69 Kč	Indifferent	10 Kč

The table above compares the attitudes with the average willingness to pay for such a service with that attitude. From first sight, there is no clear pattern of rising

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<sup>5</sup> <https://www.theverge.com/2020/1/28/21111865/scroll-ad-free-website-subscription-launches>

<sup>6</sup> There was one person stating 1 000 000, however as a payment for mothly fee this number was disregarded.

willingness to pay with growing intolerance against ads, and it is surprising that users with a neutral attitude are willing to pay more than double than those with a very negative attitude. The current data suggest that are other variables affecting the willingness to pay.

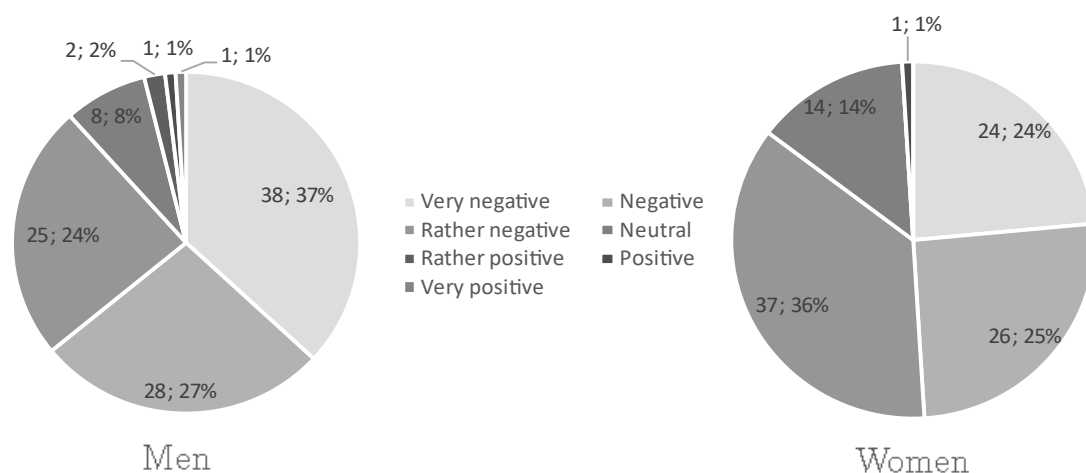
### 3.3 Differences between men and women

This subchapter looks at relationships between men and women and analyses the differences between groups of respondents. **As already mentioned, the data includes answers from 206 respondents, of which 104 are men, and 102 are women.** This section focuses on the differences in answers by each gender. Men turned out to be more likely to block ads than women with a high degree of certainty. The comparison of numbers is shown in the table below with the percentage out of the total number of respondents from each gender.

Table 4 Usage of the ad-blocking tool by gender

	Men	%	Women	%
Using	82	78,8	62	60,8
Not using	21	20,2	37	36,3
Do not know	1	1	3	2,9

The simple analysis using the Chi-Square Test of Independence confirms that with a high level of significance, there is a difference between the groups in terms of adblocker usage. (Chi-squared 7,115 > 3,814,  $\alpha = 0,05$ )



These values correspond to the different distribution of attitude shares between men and women, where men are more likely to perceive the advertisements negatively, as can be seen in the pie chart above. In the Chi-square test, the groups

of the four most stated attitudes ( $df=3$ ) do not show a statistically significant difference between genders.

In the question of reacting to anti-adblocking countermeasures, men and women do show some differences but not as large to be deserving a broader description. In the voluntary case, men tend to react more strictly as 25 % of them purposely do not comply with the website request while only 8,1 % of women do so. In the mandatory case, both sexes are similarly likely to leave the webpage without granting an exception, and men are in this situation more often trying to bypass the countermeasure.

## 4 Economic implications

This chapter looks at the issue of adblocking from the economic point of view and aims to connect the known facts and information with relevant findings from the survey. As an additional target, this part is going to further speak about important implications stemming from the usage of ad-blocking tools and describe potential outcomes for participants of the involved parties.

Online advertising is one of the main driving factors of today's internet environment and a vital source of income for a large share of internet websites. Running a website with a substantial amount of visitor traffic comes with associated costs and content creation as well. Each publisher participating on the internet needs to secure a stream of income to keep his website running unless he is using some of the free limited solutions available on the internet. In contrast to the publisher, a visitor as an individual faces significantly lower barriers and costs to access the internet. One can even imagine someone who uses only a free Wi-Fi signal to access the internet.

In section 2.4, we discussed different business models that can be used by publishers to earn revenue by monetizing their website content. In the case of advertising, the publisher is, in fact, also monetizing his visitors' attention, and visitors are paying for the content by their attention and interaction with the ads. However, as the ad load has grown to enormous levels, we can see, thanks to the available data, that many visitors nowadays perceive ads in general as something negative, with a large proportion of people who hold a very negative attitude.

This perception has led to the creation of many adblocking solutions that effectively deal with advertisements and give users positive utility by improving their online experience. Furthermore, for most devices, there is now a wide choice of free ad blocking solutions. Installation is often very simple and can be handled by inexperienced users. Since there are almost no barriers to start blocking ads and publishers are currently unable to effectively prevent adblocking visitors from viewing their website (exclude them), this puts the practice of adblocking into the *free-rider problem*. It can be said that when a user does not want to pay the publisher, this business model is the easiest to circumvent compared to others. It is much harder to, for example, cope with a paywall or hack a web server.



## 4.1 Prospects for the future

Given the questionnaire findings (subsection 3.2.1) and that adblocking is on the rise (Shankland, 2021), it can be concluded that publishers running ads should not be ignoring the adblocking problem as it may soon catch them. If we would imagine a future where the vast majority of visitors would be using ad blocking tools, it raises many interesting questions and things to think about for the publishers when planning ahead. It would be wise to consider the options and be prepared for the probable upcoming era where adblocking would be mainstream. In this subchapter, we are going to discuss and address some of the issues that may come forward.

The possibility of fighting against ad blocking is a disputable question option as many of the popular adblocking solutions are quickly employing countermeasures and enlarging their defensive filter list. Even in the case when the anti-adblocking scripts are outsourced, it is rather not a stable solution for the future because if the filter lists would be for a long time successively able to counter countermeasures, the publisher might experience periods with significant drops in income. Moreover, there could be a case when the supplier of an anti-adblocking script would go bankrupt or withdraw from the arms race and leave the company in the air. This is a real case of Czech startup NeuronAd, which after four years, disappeared from the internet. (NeuronAD, 2019)

The other solution mentioned by Komarek (2016) is the very sensitive method of noticing the users about the consequences of their ad blocking and asking the users to turn off the blockade or whitelist the website. In this scenario, it may largely depend on a publisher who would be asking or whether the users do have a long-term relationship to the content or service provided by the website. However, even if some would listen and form a sufficient income for a publisher, it would still mean that part of the visitors would be free-riding because the results suggest that some users are strictly against ads and will not allow them at all. It is thus reasonable to provide other options to contribute, like subscriptions or direct payments. The English news server The Guardian is an excellent example of how it can be done as it offers both options to contribute or subscribe with additional benefits.

A similar situation might happen in the case of entering the Acceptable Ads program, where the results suggest that in the Czech republic, the number of users participating is very low. (subsection 3.2.3) If the increase in ad blocking were to continue, then there would be a gradual rise in loss of potential earnings until the

point when the situation would stabilize, and a decent share of visitors would not be paying. Thus again, it turns out better to choose a different or at least additional approach.

The remaining option is the change of business model. For better prediction in such a scenario, it would be desirable to collect additional information from respondents about the willingness to pay for different products in a situation when free alternatives would become scarce. The good news for publishers is that the results show that more than half of respondents are already paying for the online services, and additionally, many of them would be willing to pay for the removal of ads.

## 5 Conclusion

In this thesis, I examined the situation in the Czech advertising market and briefly described the basics of adblocking, issues connected to the digital advertising industry, a slice of the arms race between publishers and adblockers and the economic perspective of adblocking.

In order to gather necessary and unavailable data about the Czech population, I conducted a survey questionnaire released to the public, which was filled by 207 respondents from a wide spectrum of people in the population. The collected data represent a valuable dataset relatively approximating the true population. The gained information helped to better understand how Czech internet users think about the issues connected to adblocking and their reaction to current anti-adblocking countermeasures. In addition, the questionnaire gathered information about the willingness of internet users to pay for online content.

The answers revealed that the vast majority of 86,4 % of respondents have a negative attitude toward advertising, but for some websites, nearly half of them are willing to display ads in order to support the concrete website. It was surprising to find out that out of non-adblocking users, nearly 40 % of respondents were unaware of the option to block ads for free even though these tools have been around for more than two decades.

A large share of respondents, after being confronted with the possibility, stated that they would like to instal an ad-blocking tool (40 %) or they are thinking about it (44 %). This suggests that there is a great potential for a future rise in adblocking usage and is a warning to adverting industry that it is reasonable to consider such future development.

In the last part, I discussed the potential outcomes of the future situation where adblocking solutions would become mainstream, and the revenue from advertising would be significantly threatened by free-riding people. The conclusion for publishers was to offer an alternative payment system for the users to pay for the content instead of simply relying on the stream of income from advertising, as there will always be some users dislinking ads and unwilling to turn off adblocking tools.

The good news for publishers is that the results show that more than half of the respondents are already paying for the online services, and additionally, many of them would be willing to pay for the removal of ads. This finding can partially ease

the potential worry of publishers about whether users would accept different content monetization models.

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