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To use or not to use ad blockers?

The roles of knowledge of ad blockers and attitude toward online advertising

Abstract: The rapid spread of ad blockers potentially threatens the sustainability of the hitherto dominant business model of ad-supported websites, in which users get web content free in return for allowing themselves to be exposed to advertising. Focusing on the users' perspective, this study proposes that (a) adoption of ad blockers is positively influenced by the level of knowledge of their advantageous features; (b) the decision to continue using ad blockers is negatively affected by attitude toward online advertising; and (c) this attitude is positively shaped by perceptions of online advertising's pleasure, credibility, and economic benefits, as well as negatively shaped by perceptions of online advertising's intrusiveness and clutter. We tested these relationships in a survey study among the members of an online panel supported by the Spanish advertising industry, and all the relationships were confirmed within a structural equation model. Our findings provide some implications for online advertising stakeholders. Web publishers and online advertisers may expect that, in the coming years, ad blockers will continue to spread rapidly as a consequence of the extension of their knowledge among Internet users. These stakeholders are thus advised to focus on improving Internet users' experiences with online advertising by reducing those ad characteristics that provoke negative reactions and by strengthening those that are positively evaluated.

Keywords: Ad blockers, advertising avoidance, psychological reactance, self-interest, attitude toward advertising.

1. INTRODUCTION

Ad blockers refer to various software tools (most typically browser plug-ins) that monitor browsers' requests for editorial and advertising content and prevent the display of any advertising content that matches an entry in the blacklists maintained by ad-blocking companies/user communities. With respect to websites' publishers, ad blockers hurt their advertising revenues by producing a loss of "ad impressions" (i.e., number of times particular ads are displayed to websites' visitors), a measure commonly used to quantify how much advertisers have to pay for the use of websites as advertising vehicles. With respect to Internet users (henceforth "netizens"), ad blockers provide them a degree of control over advertising in a way no mechanical means had previously achieved in the realm of offline media (e.g., remote controls and video recorders with respect to television commercials).

Ad blocker usage, albeit relatively small and geographically diverse, is rapidly increasing globally: 11% of global netizens (18% of North Americans and 20% of Western Europeans) were blocking online advertising in December 2016, with 615 million devices running ad-blocking software, about 30% more than in December 2015 (PageFair, 2017). The growing loss of ad impressions is progressively undermining ad-financed websites' capacity to monetize the provided content. A game-theoretic approach suggests that these websites could compensate their ad revenue decreases by combining ad-financed and fee-financed monetization strategies (Vratonjic et al., 2013), but in practice fees represent only a small share of websites' revenues and are sustainable only for very distinctive content (Shiller et al., 2018). In turn, an empirical study shows how the spread of ad blockers challenges the business model of small/medium ad-supported websites: in the short run, these websites may increase their traffic because ad blocker spread makes it possible for more and more netizens to use the provided content without viewing ads; but in the long run,

increased losses of ad impressions may produce revenue reductions that undermine websites' investments in content quality to continue attracting netizens (Shiller et al., 2018).

Many previous articles (mostly from professional journals) have described the operation/performance/impact of ad blockers and have also investigated possible technical solutions to bypass ad-blocking software tools. However, there appear to be no research studies (published in peer-reviewed journals) that have analyzed the causes of the rapid spread of ad blockers from the netizens' perspective. From our standpoint, this perspective helps develop a deeper understanding of the phenomenon because netizens have the final say in the decision on whether or not to use ad blockers, a decision driven not only by technical/economic aspects of the software (e.g., ease/cost of installation) but also by psychological aspects of netizens (e.g., perceptions/attitudes/reactions to online advertising). Our tentative explanation for ad blocker usage is based on the integration of interdisciplinary knowledge, such as the theory of psychological reactance (Brehm, 1966), the norm of self-interest (Miller, 1999), and the maxim of enlightened self-interest (Froome, 1997), all of which will be discussed in the next section.

2. CONCEPTUAL FRAMEWORK AND HYPOTHESIS DEVELOPMENT

2.1. Mechanical avoidance of advertising

Psychological reactance theory posits that whenever people perceive that their freedom to act or decide is threatened/restricted/eliminated, they tend to undergo a motivational reaction ("reactance") that is intended to reaffirm/reestablish their affected freedom (Brehm, 1966; Brehm and Brehm, 1981). This theory has been increasingly used to explain why people develop patterns of advertising avoidance (e.g., Baek and Morimoto, 2012; Clee and Wicklund, 1980). We first describe how psychological reactance occurs in response to traditional television commercials. When TV viewers are enjoying their chosen programs, program content is often interrupted by breaks of unsolicited commercials. These breaks

force viewers to postpone their program viewing for a time during which promotional messages are alternatively shown. Viewers tend to experience a negative reaction and become motivationally aroused to do other activities inside or outside the room instead of paying attention to the commercials. By devoting time and attention to alternative activities chosen by themselves, viewers reestablish their perceived loss of freedom of choice.

In contrast to patterns of “mental avoidance,” such as ignoring commercial breaks, or “physical avoidance,” such as leaving the room, the term “mechanical avoidance” was coined specifically to refer to the mediation of technical devices that have been historically developed (Dix and Phau, 2010; Kelly et al., 2010). Initially, remote controls enabled TV viewers to scan effortlessly other channels’ programming during commercial blocks (“zapping”). Later, video cassette recorders (VCRs) and digital video recorders (DVRs) allowed TV viewers to reduce advertising exposure time by fast-forwarding through commercial blocks when replaying their recorded programming (“zipping”). Such devices brought significant control over commercials to users by making these freer to choose what they pay attention to and what they spend time on.

2.2. Avoidance of online advertising through ad blockers

Compared to television watching, web navigation leads to the experiencing of higher levels of control, challenge, arousal, and focused attention (Novak et al., 2000). The Internet is a medium through which users are usually more involved in achieving their hedonic/utilitarian goals with a stronger sense of freedom (Cho and Cheon, 2004; Korgaonkar and Wolin, 1999). In the online environment, forced exposure to unsolicited advertising is often perceived as a hindrance to the tasks undertaken to achieve personal goals, all of which produces significant levels of psychological reactance (e.g., Campbell et al., 2017; Edwards et al., 2002). Indeed, comparing advertising avoidance across media, users report higher

levels for the Internet than for any offline medium and, in particular, higher levels for YouTube video ads than for television commercials (Kim and Seo, 2017).

The invention of ad-blocking software tools allowed netizens to navigate with almost no advertising and stay tightly focused on their goal-oriented tasks. Compared to TV remotes/VCRs/DVRs, ad blockers are a more radical means of mechanical advertising avoidance because they are able to automatically prevent exposure to most online advertising without users even being aware of its presence on the websites visited. Another difference lies in how the capacity to avoid advertising is acquired: for ad blockers, it is a direct and immediate consequence of installing an ad-blocking tool, while for TV remotes/VCRs/DVRs, it is an indirect and perhaps incidental consequence of purchasing a modern television set or a video recorder device.

Ad blockers have spread so quickly and widely among netizens because such tools have the convenient features that Rogers (2010) links with the rapid adoption of innovations: extreme ease of installation and use, free availability of basic versions, high compatibility with other software tools, significant advantage over past practices, and clear demonstrability of results. With virtually no technical, operational, and economic requirements, the adoption of ad blockers is a rather simple process in which the decision to adopt (i.e., install) this innovative software is basically conditioned by the level of knowledge acquired by netizens through mass/interpersonal channels regarding the advantageous features of ad blockers. Many netizens most likely install ad-blocking software simply after gaining sufficient knowledge of how easily this innovation helps them restore control over online advertising. Later on, adopters of ad-blocking software may decide to either continue or stop using it, a decision that will be discussed subsequently. Based on this reasoning, we expect:

H1: The more netizens acquire knowledge of ad blockers, the more likely it is that netizens adopt ad blockers, regardless of whether later on a part of the adopters continue to use them (H1a) or another part stop using them (H1b).

Given that uninstalling/deactivating ad-blocking software is a very simple task, it is expected that sooner or later adopters of ad blockers will face the dilemma of deciding on whether or not to continue using them. These alternative decisions stem from clearly differentiated personal motivations.

The decision to continue using ad blockers involves a motivation to maintain strict control over unsolicited advertising in order to maximize the focus on one's online goal-oriented tasks. Such a decision conforms to an immediate gratification pattern because it consists in using all entertainment/informational content without being exposed to the advertising that allows to continue supporting and improving such content. A decision of this type is primarily driven by the norm of self-interest, which, according to Miller (1999), is the motivation that leads to making those choices that provide the best results for one's own narrowly-defined goals. Even though the norm of self-interest consistently fails to provide a general explanation for human behavioral motivation (e.g., Miller and Ratner, 1996, 1998), self-interested decision-making is more likely to occur when the costs and benefits of the particular decision are clear, when people perceive that the particular decision will have a significant impact on their lives, and when people think that the domain in question is one in which self-interest should prevail (e.g., Chong et al., 2001; Gerbasi and Prentice, 2013), three conditions that closely resemble those under which ad blocker adopters have to decide.

By contrast, the decision to stop using ad blockers involves a motivation to accept a loss of self-control by permitting unsolicited advertising to interfere in the execution of one's online goal-oriented tasks. Such a decision conforms to a deferred gratification pattern because the "cost" of being exposed to online advertising yields a "benefit" for content

publishers, thanks to which these can continue to offer and improve their content. A decision like this is primarily driven by “enlightened self-interest,” which motivates making choices in the interest of others with the expectation that those choices ultimately serve self-interest. The concept of enlightened self-interest is mainly used in the field of corporate social responsibility to argue that firms should behave responsibly toward employees, customers, and other relevant parties in society, which would then provide such firms with long-term benefits such as greater employee and customer loyalty and a more supportive external environment (e.g., Frooman, 1997; Steiner, 1972).

The fact that netizens are motivated in one way or another is hypothetically driven by their attitude toward online advertising, which, consistent with MacKenzie and Lutz (1989), is defined as a learned predisposition to respond in a consistently favorable or unfavorable manner toward Internet ads. There is indeed strong evidence that responses of approach or avoidance to advertising are largely determined by attitude toward advertising, regardless of whether this attitude refers to advertising in general (Prendergast et al., 2010; Rojas-Méndez and Davies, 2005) or advertising in specific media (Speck and Elliott, 1997a), and regardless of whether these media are online (Jin and Villegas, 2007; Kim and Seo, 2017) or offline (Speck and Elliott, 1997a). Importantly, attitude toward advertising specifically allows for predicting mechanical advertising avoidance through TV remotes/VCRs/DVRs (Lee and Lumpkin, 1992; Olney et al., 1991). Based on these arguments and evidence, we hypothesize that the ad blocker adopters with more negative (positive) attitudes toward online advertising will be more (less) prone to avoid web ads and, consequently, they will likely continue (cease) to use ad blockers to behave in a consistently unfavorable (favorable) manner toward online advertising. Stated formally:

H2a: The more adopters of ad blockers have a negative attitude toward online advertising, the more likely it is that these individuals will continue to use ad blockers.

H2b: The more adopters of ad blockers have a positive attitude toward online advertising, the more likely it is that these individuals will stop using ad blockers.

2.3. Antecedents of attitude toward online advertising

Attitude toward advertising is a learned predisposition that individuals slowly develop as they perceive the advantages and disadvantages that advertising accrues to themselves and/or to others in society. Certain advertising qualities are generally perceived as advantageous (disadvantageous) and then tend to induce favorable (unfavorable) predispositions toward advertising. As shown in Figure 1, we hypothesize that three qualities help improve attitude toward advertising (pleasure, credibility, and economic benefits) and two others help worsen it (intrusiveness and clutter).

-- PLEASE INSERT FIGURE 1 ABOUT HERE --

Regarding the influence of pleasure quality, previous evidence shows that exposure to pleasant ads is capable of enhancing recipients' mood (Chang, 2006) and that advertising-evoked pleasure plays a key role in mediating the attitudinal effects of advertising (Holbrook and Batra, 1987; Holbrook and O'Shaughnessy, 1984). More importantly for this study, perceived value of advertising (Ducoffe, 1995) and attitude toward advertising (e.g., Schlosser et al., 1999; Wolin et al., 2002) have been found to be enhanced after the experience of pleasure in advertising exposure. Thus we propose:

H3: The more netizens experience pleasure in online advertising, the more positive their attitude toward it will be.

Advertising credibility is defined as the extent to which recipients perceive advertising claims to be truthful and to provide valuable information to themselves and

society (MacKenzie and Lutz, 1989; Obermiller and Spangenberg, 1998). The more recipients perceive that advertising provides reliable/essential/accurate information about the quality/performance of products, the more they are willing to accept and appreciate advertising, regardless of being online (Wang and Sun, 2010) or offline (MacKenzie and Lutz, 1989). Likewise, recipients tend to be more skeptical and critical of advertising as they perceive that this provides biased/unsubstantiated information, false/misleading claims, half-truths, and/or promises of magical results (e.g., Pollay and Mittal, 1993; Wolin et al., 2002). Therefore, we expect:

H4: The more netizens perceive online advertising as credible, the more positive their attitude toward it will be.

Advertising generates different economic benefits for individuals, organizations, and society: it provides significant financial support to the mass media, stimulates demand for goods and services in the market, promotes competition among firms within each industry, accelerates adoption of innovations by consumers, raises general standards of living, etc. Better appreciation of these benefits leads to a more positive attitude to offline advertising (Pollay and Mittal, 1993). With regards to online advertising, however, there is mixed evidence: while one study found the same positive relationship (Wang and Sun, 2010), others unexpectedly found no relationship at all (Saadeghvaziri et al., 2013; Wolin et al., 2002). Advertising benefits will likely be more noticeable in an online context because the Internet has made it possible for more entertainment/informational content to be offered for free, for commercial transactions to be made more quickly and with fewer intermediaries, for business competition to become truly global, etc. Hence, we propose:

H5: The better netizens evaluate the economic benefits of online advertising, the more positive their attitude toward it will be.

Advertising intrusiveness is primarily a cognitive process in which recipients perceive ads in a media vehicle to be distracting or interfering with the goals they pursue in using that vehicle (Li et al., 2002). For this reason, perception of advertising intrusiveness tends to evoke negative emotional reactions, such irritation and annoyance, with advertising (Edwards et al., 2002). In the context of online goal-oriented tasks, consistent evidence shows that perceived intrusiveness of advertising leads to more negative attitudes toward online advertising (e.g., Goodrich et al., 2015; Morimoto and Chang, 2009). Thus we posit:

H6: The more netizens perceive online advertising as intrusive, the more negative their attitude toward it will be.

Perceived advertising clutter refers to recipients' sense that the amount of unsolicited advertising in a medium is excessive relative to the amount of non-promotional content sought in that medium (Elliott and Speck, 1998). An excessive amount of advertising "noise" overloads recipients with too many distracting messages and forces them to selectively allocate their limited attentional resources (Ha and McCann, 2008). Not surprisingly, then, perceived advertising clutter has a negative influence on attitude toward advertising with regard to offline media (e.g., Ha, 1996; Speck and Elliott, 1997b). However, unexpectedly, Lee and Cho (2010) found no influence at all in the realm of online media. But, since netizens are more active than offline media users in seeking out specific goal-oriented content (Ha and McCann, 2008), we may expect:

H7: The more netizens perceive online advertising clutter, the more negative their attitude toward online advertising will be.

3. METHOD

3.1. Data collection

We designed an ad-hoc questionnaire and pretested it for clarity and understanding with a convenience sample of 32 netizens. Then *AIMC* (*Asociación para la Investigación de*

Medios de Comunicación) distributed our final questionnaire online to the *AIMC Q Panel* members and also managed the collection, monitoring, and processing of the data.

AIMC is a non-profit, neutral organization that represents the Spanish advertising industry's stakeholders (media owners, advertisers, agencies, and other companies providing advertising services). As a joint industry committee, *AIMC* is entrusted with the planning, execution, control, and publication of media audience measurements that are then used by the stakeholders as a currency to buy/sell and plan advertising space and time. *AIMC*'s stakeholders contribute to the financing of its media audience surveys and are democratically represented in its decision-making structures, all of which endorse both the neutrality of *AIMC* and the transparency of its research procedures.

AIMC Q Panel is one of the media audience surveys, initiated in 2013. This panel is based on a pool of registered persons (panelists) who have agreed to complete the questionnaires provided online by *AIMC* on a regular basis (about six times a year). These panelists must be netizens, aged 14 years or older, and residents of Spain. The *AIMC Q Panel* is composed of 4,500 panelists who have previously participated in another *AIMC* survey (*Estudio General de Medios*) after being selected through a random route procedure.

On 24 January 2017, *AIMC* emailed its panelists an invitation to fill in our questionnaire as if it were one of *AIMC*'s own. In the following days, *AIMC* sent out three reminders in order to encourage the participation of the panelists, who are paid just five euros for every seven questionnaires answered. On 15 February 2017, *AIMC* collected the last questionnaire completed and then made the questionnaire's website inaccessible.

3.2. Participants

The questionnaire was completed by 1,995 panelists, which accounts for 44% of the total, a response rate within the usual range of *AIMC Q Panel*. But 484 subjects were invalidated for having inconsistently responded to at least one of the three control questions, which had

been interspersed among ordinary questions within the first, second, and third thirds of the questionnaire.

The final sample thus consisted of 1,511 subjects (814 males and 697 females), with the following age distribution: 12% under 25 years of age, 13% aged between 25 and 34, 29% aged between 35 and 44, 27% aged between 45 and 54, 14% aged between 55 and 64, and 5% above 64. Regarding ad blocker usage, 465 subjects (31%) were current users, 124 (8%) were past users, and 922 (61%) had never been users.

3.3. Variables

Seven variables were defined as latent because they referred to relatively abstract/complex phenomena. Each latent variable was measured using four items adapted from previous studies – namely, Knowledge of ad blockers (Sandvig et al., 2011), Attitude toward online advertising (Bauer et al., 2005; Saadeghvaziri et al., 2013), Pleasure induced by online advertising (Pollay and Mittal, 1993; Wolin et al., 2002), Perceived credibility of online advertising (Obermiller and Spangenberg, 1998), Economic evaluation of online advertising (Pollay and Mittal, 1993; Rojas-Méndez et al., 2009), Perceived intrusiveness of online advertising (Chang et al., 2013; Edwards et al., 2002), and Perceived online advertising clutter (Cho and Cheon, 2004; Speck and Elliott, 1997b). All the items were rated on a seven-point Likert scale (from $-3 = \textit{completely disagree}$, to $3 = \textit{completely agree}$). The items used in our model appear in Table 1.

-- PLEASE INSERT TABLE 1 ABOUT HERE --

The other two variables were quite simple, having been measured through direct questions to the participants. Current users of ad blockers was coded 1 for those participants who were using ad blockers at the moment, and 0 otherwise. Past users of ad blockers was coded 1 if the participant had been using ad blockers previously but decided to stop using them, and 0 otherwise.

3.4. Statistical procedures

Partial least squares structural equation modelling (PLS-SEM) was used to determine if the latent variables were effectively measured by their corresponding items and if the relationships hypothesized in the structural model were empirically confirmed. These statistical analyses were performed with *SmartPLS 2.0* (Ringle et al., 2005). Generally recommended criteria (Hair et al., 2016) were used to select algorithm, bootstrapping, and blindfolding settings (e.g., z-standardization and 5,000 bootstrap samples) and to evaluate results (rules of thumb concerning convergent validity, internal reliability, size effect, etc.). The measurement of all latent variables was specified as reflective (instead of formative) because their corresponding items represented consequences (more than causes) and were originally interchangeable.

4. RESULTS

4.1. Latent variable measurement

Convergent validity (i.e., the extent to which a latent variable's items share a high proportion of variance) was assessed on items' outer loadings and the latent variable's average variance extracted (AVE), whose values are shown in Table 1. On the one hand, 26 items with outer loadings above 0.7 were considered appropriate because they represented more than the recommended proportion of variance, while two items below 0.7 were considered for removal and finally omitted because their deletion led to an increase in the composite reliability or the AVE above the suggested threshold value ("I know that these blockers filter out advertisements that might interest me" from Knowledge of ad blockers and "Online advertisements are necessary to support websites" from Economic evaluation of online advertising). On the other hand, the AVE values of the seven latent variables were above the critical value of 0.5, indicating that these constructs explain more than half of the variance of their corresponding items.

Internal consistency reliability (i.e., the extent to which a latent variable's items are similar in their scores) was measured through composite reliability, which is interpreted in the same way as Cronbach's alpha. The seven latent constructs had composite reliability values above the threshold of 0.7 (Table 1), suggesting that their corresponding items achieved sufficient levels of similarity.

Discriminant validity (i.e., the extent to which a construct is truly distinct from other constructs in the model) was assessed by two criteria. Firstly, based on comparison of cross loadings, each item's outer loading on its associated latent variable was consistently higher than all the item's cross loadings with other latent variables. Secondly, according to the Fornell-Larcker criterion, in all cases the square root of each latent variable's AVE was greater than the latent variable's highest correlation with any of the other latent variables in the model (Table 2). The fulfillment of both criteria provided support for adequate discriminant validity.

-- PLEASE INSERT TABLE 2 ABOUT HERE --

4.2. Structural model assessment

To first determine whether there were collinearity issues in the structural model, we examined the level of collinearity among the predictors of Attitude toward online advertising (Pleasure induced by online advertising, Perceived credibility of online advertising, Economic evaluation of online advertising, Perceived intrusiveness of online advertising, and Perceived online advertising clutter) and among the predictors of Current/Past users of ad blockers (Knowledge of ad blockers and Attitude toward online advertising). The variance inflation factor (VIF) values of these predictors were all below 1.5, which is much lower than the critical level of collinearity (VIF = 5).

To later assess the structural model relationships, we tested the significance of path coefficients and measured their relevance through the f^2 and q^2 effect sizes. A path

coefficient represents the estimated change in the endogenous variable for a unit change in the predictor and can be interpreted relative to one another as a standardized beta in a regression analysis. f^2 and q^2 coefficients measure of the relative impact of a predictor on an endogenous variable and their values of 0.02, 0.15, and 0.35 can be interpreted as small, medium, and large effect sizes, respectively.

As shown in Table 3, all hypothesized relationships in the structural model were significant at least at $p < 0.01$, but their degrees of relevance were found to be quite different. As expected, knowledge of ad blockers had a positive effect on the decision to adopt them, regardless of whether later on certain adopters continued to use them (H1a) or others stopped using them (H1b), with the latter showing a much smaller size effect. Moreover, a relatively more negative attitude toward online advertising influenced those who decided to continue using ad blockers (H2a), while a relatively more positive attitude toward online advertising affected those who choose to stop using ad blockers (H2b), with both showing very small size effects. In turn, attitude toward online advertising was influenced by the five hypothesized antecedents (H3-H7) with different explanatory contributions: the positive predictors (pleasure, credibility, and economic benefits) had more explanatory power than the negative predictors (intrusiveness and clutter), with pleasure as the most influential among the first ones and clutter as the least influential among the second ones.

-- PLEASE INSERT TABLE 3 ABOUT HERE --

5. DISCUSSION

5.1. The role of knowledge of ad blockers

This study provides novel support for the assumption that ad blocker adoption is directly determined by the level of knowledge acquired by netizens of the advantageous features of ad-blocking software tools. Our theoretical basis for this assumption was founded on three

interconnected arguments. First, when netizens are forced to view advertising that interrupts their goal-oriented online activities, they tend to experience a psychological reaction that is intended to restore their loss of control. Second, the invention of ad blockers provided a revolutionary means of mechanical advertising avoidance, through which netizens automatically can maintain very effective control over unsolicited online advertising. Third, the extremely convenient features of ad blockers helps netizens adopt this invention easily and rapidly because their adoption decision, with no other major requirements, may be a simple and direct consequence of having gained enough knowledge of such features.

The finding of a direct relationship between knowledge and adoption of ad blockers has practical implications. In the coming years, knowledge of ad blockers is very likely to continue its spread in society as a result of the increasing availability of formal information from media, informal information from colleagues/friends/relatives, data incidentally gathered in web navigation, etc. This progressive extension of knowledge of ad blockers is then expected to lead to a progressive appearance of new adopters, who will be prone to using this innovate software to restore their control over unsolicited online advertising. It is also foreseeable that a large majority of the new adopters will continue to use ad-blocking software permanently because we found a high prevalence of the group of current users (about four-fifths of all adopters). These forecasts threaten to further reduce the outlook of profitability for online advertising stakeholders, who are in turn advised to mitigate this unfavorable situation through means such as those discussed in the next section.

Our study has been limited to examining the role that knowledge of ad blockers plays in isolation. However, this variable likely affects netizens in connection with some of their personality factors, such as proactiveness orientation and risk-taking propensity. Proactiveness orientation will determine the willingness to take the initiative to install ad blockers, and risk-taking propensity will determine the willingness to accept potentially

harmful results from the installation of ad blockers, such as infection with virus/malware/spyware. The netizens sufficiently informed of ad blockers could delay the installation if they are very passive or are afraid of the risks involved, while those insufficiently informed could anticipate the installation if they are very proactive or are prone to taking risks. These are important open empirical questions for future research.

Another limitation of our study relates to the use of self-reported, rather than observational, data. The data so collected might contain inaccurate/misleading information that the interviewees would have reported intentionally/inadvertently. Some interviewees might have reported to be users of ad blockers, but in reality they might be wrong after having installed other types of plug-ins/programs/applications. In turn, other interviewees might have reported to be non-users, but they might have installed an ad blocker unconsciously or forgotten they had installed it intentionally. Hence, the use of observational data in future research would provide a more accurate representation of the phenomenon under consideration.

5.2. The role of attitude toward online advertising

A second novel finding of this study is that attitude toward online advertising serves as a motivational force to resolve the dilemma of either continuing or stopping the use of ad blockers. Negative attitudes increase the probability that netizens, revealing self-interested motivations, choose to reject the reception of online advertising without caring about the contribution this makes to the maintenance and improvement of web content. By contrast, positive attitudes increase the probability that netizens, revealing motivations based on enlightened self-interest, choose to accept the reception of online advertising as a legitimate and collaborating counterpart to the use of web content.

Several practical implications stem from the finding that attitude toward online advertising affects the decision of whether or not to continue using ad blockers. In light of

this, we recommend a general critical reflection and a set of specific actions that might help online advertising stakeholders reduce ad blocker usage.

Our general reflection is related to the recent criticism that, from within the advertising industry, publishers and advertisers have paid excessive attention to the technological battle against ad blocker developers and insufficient attention to the measurement and improvement of netizens' advertising-related experiences (Ozer, 2017). The repeated exposure to annoying/irritating ads has impoverished the browsing experiences of many netizens, who have developed unfavorable predispositions toward online advertising in general, which allows them to justify their self-interested motivation in continuing to use ad blockers without caring about the legitimate interests of web publishers. Thus, it is urgent that current users of ad blockers acquire an enlightened self-interested perspective. This difficult challenge would be more easily affordable if current users of ad blockers perceived the same perspective among online advertising stakeholders who, however, are often more focused on developing counter-ad blocking tools, such as adblock walls and domain name rotation, than on creating rewarding experiences for netizens.

Regarding the specific actions, the identified antecedents of attitude toward online advertising allow us to suggest some improvements in its content, format, quantity, and reputation.

The content of online ads should be both enjoyable and credible. If online ads are boring/disagreeable, advertisers will more likely be engaged in a cat and mouse game with netizens trying to avoid being exposed to such ads. However, if online ads are appealing/pleasant, netizens will more likely want to see such ads and sometimes even share them with friends. It is worth recalling that ad-induced pleasure was found to be the most influential antecedent of attitude toward online advertising. Moreover, predisposing the public favorably is easier when ads provide reliable and accurate information about the

products/services and when false claims, half-truths, and other deceptive practices are avoided. In the same way, we consider as inappropriate those “native ads” (i.e., paid ads designed to look like news stories) that are not clearly labeled as sponsored content and thus undermine the legitimate right of netizens to distinguish between factual information and promotional messages.

The advertising formats that most distract or interfere with web navigation should not be used in order to improve netizens’ advertising-related experiences. In this sense, we endorse the recent efforts of some online advertising stakeholders to determine that certain formats (pop-up ads, auto-playing video ads with sound, non-skippable video ads, etc.) are below standards of acceptability (Coalition for Better Ads, 2017; Teads, 2015).

The amount of ads received by each user of a website should be limited by its publisher in a way that maintains a balance with the amount of non-promotional content provided by the website. Not exceeding netizens’ threshold of saturation will prevent them from developing negative attitudes toward the website in particular and online advertising in general.

The reputation of online advertising should be improved by its stakeholders through massive educational campaigns that spread a greater and deeper awareness of the economic benefits that online advertising represents for media, consumers, markets, companies, industries, and the economy and society as a whole.

A further limitation of our study is that the role of attitude toward online advertising was examined in isolation. We suggest that future studies examine possible interactions of this variable with psychographic factors such as orientation toward ethical behavior and tendency toward immediate/deferred gratification. For example, netizens with negative attitudes toward online advertising could reconsider their willingness to use ad blockers if

they adopt ethical standards in decision-making or are willing to endure the immediate annoyance of advertising rather than the future impoverishment of content.

Finally, this study has the obvious limitation of using cross-sectional, rather than longitudinal, data. Cross-sectional data provide a simplified static representation of reality and may not reflect important aspects of the phenomenon under consideration. A weakness of this study is not having measured dynamically how the actions of advertising stakeholders may improve (worsen) attitudes toward online advertising and thus may ultimately discourage (encourage) ad blocker usage. The use of longitudinal data in future studies could provide a better understanding of the process by which netizens' experiences with online ads are actively shaping their attitudes toward online advertising, which in turn are actively conditioning their usage behavior with ad blockers. It would also allow for answering some opening questions, such as to what extent the intensity of advertising stimuli influences netizens' positive/negative experiences, at what speed netizens change their attitudes and behaviors, and what types of netizens are more/less prone to these changes. The answers to questions like these could serve to formulate and implement strategies that first help restore the confidence of ad blocker users and then manage to get a larger share of these individuals to stop using ad blockers.

6. CONCLUSIONS

The analysis of ad blocker usage from the netizens' perspective provides two important insights for better understanding this complex phenomenon. Firstly, the level of knowledge of ad blockers plays a crucial role in their adoption by netizens, which allows for predicting that ad-blocking software will continue its rapid spread in the coming years and weaken the very foundation of ad-supported websites' business model. Secondly, negative (positive) attitudes toward online advertising play a significant role in netizens' decision to continue (stop) using ad blockers, which issues a call for advertising stakeholders to improve

netizens' attitudes toward online advertising by strengthening its positively perceived qualities and weakening its negatively perceived ones. Given the foreseeable evolution and managerial implications of this phenomenon, it is becoming increasingly important to investigate more deeply how the motivations of current users of ad blockers can be changed.

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Figure 1. Hypothesized structural model.

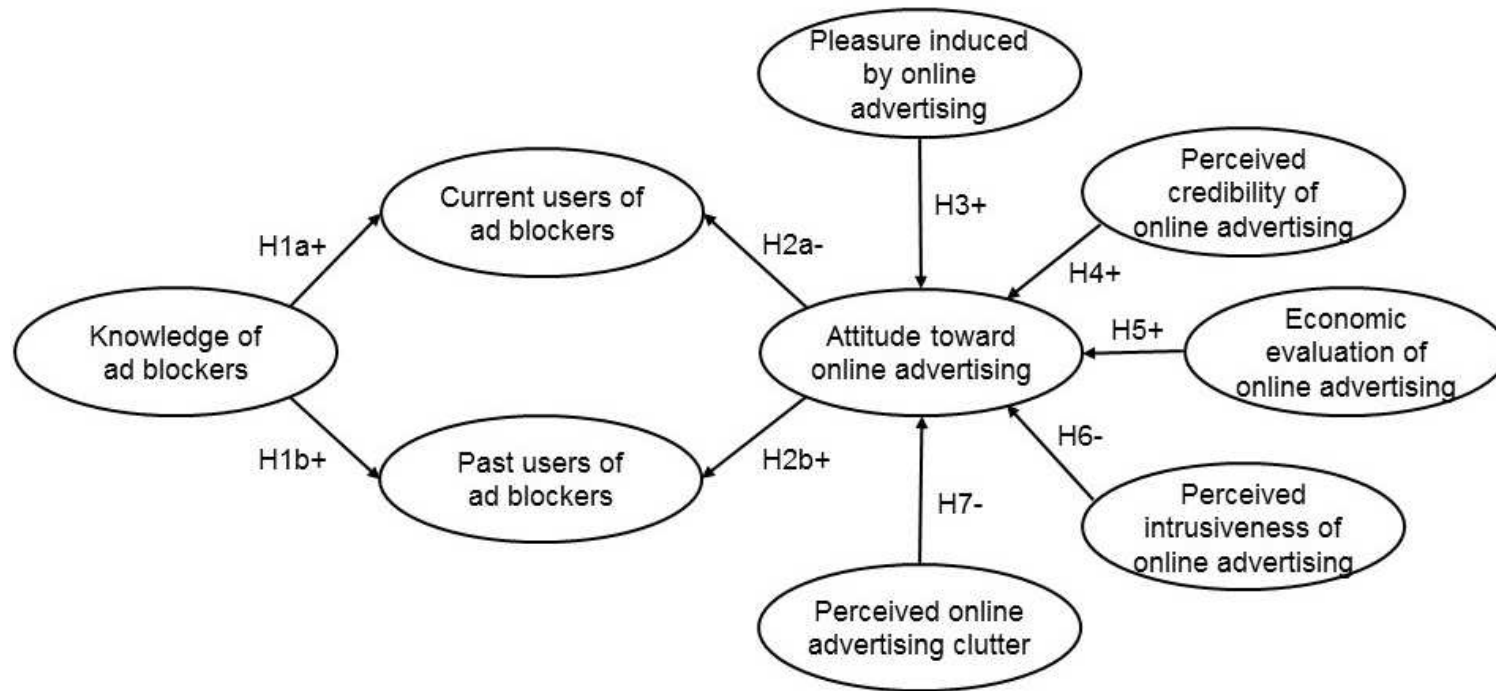


Table 1. Measurement of latent variables.

Latent variables	Items	Outer loadings
Knowledge of ad blockers (AVE = 0.804; CR = 0.925)	I have knowledge about the tools that block Internet advertising such as Adblock (<i>kab_1</i>)	0.929
	I am aware that these tools (ad blockers) are easy to install on a computer (<i>kab_2</i>)	0.942
	I know that ad blockers reduce risk of viruses and malicious software (<i>kab_3</i>)	0.814
Attitude toward online advertising (AVE = 0.810; CR = 0.945)	I think Internet advertisements are worth it (<i>aoa_1</i>)	0.884
	Generally, I consider Internet advertising to be a good thing (<i>aoa_2</i>)	0.924
	My general opinion about Internet advertising is highly favorable (<i>aoa_3</i>)	0.908
	I appreciate seeing advertising messages on the Internet (<i>aoa_4</i>)	0.883
Pleasure induced by online advertising (AVE = 0.705; CR = 0.905)	Internet advertising is very entertaining (<i>poa_1</i>)	0.831
	Sometimes I take pleasure in thinking about what I saw or heard on online ads (<i>poa_2</i>)	0.829
	Viewing online advertisements is a pleasant experience for me (<i>poa_3</i>)	0.876
	Sometimes online advertising is even more enjoyable than other Internet content (<i>poa_4</i>)	0.822
Perceived credibility of online advertising (AVE = 0.738; CR = 0.918)	Consumers may obtain reliable information through Internet advertising (<i>coa_1</i>)	0.729
	Most Internet advertisements are trustworthy (<i>coa_2</i>)	0.881
	Online advertisements reliably inform about the quality of products (<i>coa_3</i>)	0.920
	Internet advertisements accurately reflect what products are like (<i>coa_4</i>)	0.893
Economic evaluation of online advertising (AVE = 0.703; CR = 0.876)	Internet advertising contributes to society's economic development (<i>eoaa_1</i>)	0.835
	Internet advertising helps raise our standard of living (<i>eoaa_2</i>)	0.872
	Online advertisements promote competition, which benefits consumers (<i>eoaa_3</i>)	0.807
Perceived intrusiveness of online advertising (AVE = 0.727; CR = 0.914)	Online advertising gets in the way of my Internet searches (<i>ioaa_1</i>)	0.870
	Online advertising disrupts my activity on the Internet (<i>ioaa_2</i>)	0.921
	Online advertising distracts me from my objectives while on the Internet (<i>ioaa_3</i>)	0.707
	Internet advertisements intrude on the content I am accessing (<i>ioaa_4</i>)	0.896
Perceived online advertising clutter (AVE = 0.882; CR = 0.968)	There are too many advertisements on the Internet (<i>oaa_1</i>)	0.953
	Internet advertisements are very repetitive (<i>oaa_2</i>)	0.911
	Web sites are full of advertising messages (<i>oaa_3</i>)	0.948
	We Internet users are inundated with so much online advertising (<i>oaa_4</i>)	0.945

Note: AVE = Average variance extracted; CR = Composite reliability.

Table 2. Assessment of discriminant validity.

Latent variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)
(1) Knowledge of ad blockers	0.897						
(2) Attitude toward online advertising	0.035	0.900					
(3) Pleasure induced by online advertising	-0.027	0.619	0.840				
(4) Perceived credibility of online advertising	-0.006	0.547	0.404	0.859			
(5) Economic evaluation of online advertising	0.033	0.560	0.465	0.402	0.838		
(6) Perceived intrusiveness of online advertising	-0.013	-0.402	-0.279	-0.250	-0.242	0.853	
(7) Perceived online advertising clutter	0.037	-0.289	-0.259	-0.189	-0.153	0.287	0.939

Note: The square root of AVE values is shown on the diagonal; nondiagonal elements are the latent variable correlations.

Table 3. Evaluation of the structural model hypotheses.

Hypothesized relationships	Path coeff.	<i>t</i> values	Sig.	<i>f</i> ²	<i>q</i> ²
H1a: Knowledge of ad blockers → Current users of ad blockers	0.673	48.440	<i>p</i> < 0.001	0.829	0.821
H1b: Knowledge of ad blockers → Past users of ad blockers	0.146	7.720	<i>p</i> < 0.001	0.022	0.022
H2a: Attitude toward online advertising → Current users of ad blockers	-0.081	4.287	<i>p</i> < 0.001	0.012	0.012
H2b: Attitude toward online advertising → Past users of ad blockers	0.069	2.620	<i>p</i> < 0.01	0.005	0.005
H3: Pleasure induced by online advertising → Attitude toward online advertising	0.335	12.371	<i>p</i> < 0.001	0.183	0.116
H4: Perceived credibility of online advertising → Attitude toward online advertising	0.256	11.505	<i>p</i> < 0.001	0.117	0.076
H5: Economic evaluation of online advertising → Attitude toward online advertising	0.251	11.349	<i>p</i> < 0.001	0.106	0.069
H6: Perceived intrusiveness of online advertising → Attitude toward online advertising	-0.164	7.385	<i>p</i> < 0.001	0.054	0.035
H7: Perceived online advertising clutter → Attitude toward online advertising	-0.069	3.213	<i>p</i> < 0.01	0.010	0.007