Department of Business and Management

Marketing Plan & Markstrat Simulation

"The era of Hypertargeting: privacy and personalization effect on advertisement effectiveness in different contexts"

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I. INTRODUCTION

Since the beginning of 2018, privacy and sensitive information have been the trending topics across digital media, appering to be also one of the most recurring news theme. But what is the reason of that? We can found an explanation citing some of the most important events that followed and actually fed this trend.

On March 18th 2018, Christopher Wylie uncovered the Cambridge Analytica scandal, unveiling the harvest of personal data of millions of Facebook users without their consent. This data was then used to influence last US presidential election, in which Donald Trump resulted the winner.

On April 10th 2018, Zuckerberg was summoned by the US Congress to testify about the matter. The hearing lasted five hours, and symbolizes an important shift on how privacy and data handling practices are now seen by the general public.

On May 25th 2018, the General Data Protection Regulation was implemented. Also known as GDPR, this regulation is a European law on data protection that addresses the handling of personal data by companies, introducing a unified set of forms and practices with the European Union. Interestingly enough, the regulation introduced a norm, among others, that obliges business to "report any data breaches within 72 hours if they have an adverse effect on user privacy"[1], and fines for the violators "up to €20 million or up to 4% of the annual worldwide turnover of the preceding financial year in case of an enterprise"[2]. It represents a radical change, considering how data breaches were handled before the regulation.

But in 2018, privacy had suddenly became a priority not only for individuals, but also for managers and companies. It's a tight equilibrium where on the one hand users prefer and expect personalized services, but on the other they have concern about how their data is handled and use, fearing misuse and data breaches. These concerns have been the main subject of this research, as I investigated and tried to understand their role in affecting advertisement effectiveness. Along with privacy, another important topic is "personalization", considering the rapid growth of hypertargeting practices that occurred during recent times. In fact "as competition increases, businesses face even more pressure

[1] Intersoft Consulting, "*GDPR*", https://gdpr-info.eu/
[2] *Ibidem.*

to create personally curated experiences that drive consumer engagement and differentiation in the market"[3]. Interestingly enough, "83% of consumers are willing to share their data to enable a personalized experience"[4]. For this reason in this thesis I'll explain how I investigated both privacy concern and personalization effects on advertisement effectiveness, taking into account another important factor: the context in which the advertisement is presented. The thesis will be presented as follows: we will define and explain the theory and the methodology behind our research, considering a short literature review of the matters at hand. We will then move on the core of our research: the first step, consisting of the survey I conducted to collect data about privacy concern,and the second step, consisting of a mouse tracking experiment in which I collected data about advertisement effectiveness in different contexts and the effect of personalization. After discussing the results and the implications of my research, I will go through three practical cases, one of which was followed and curated by the digital marketing agency where I'm currently employed. Finally, conclusions of this thesis will be presented. We will address what the near future possibly holds for Advertising as a field, using the results of this research as foundation.

[3] Accenture, "*Personalization Pulse Check", https://www.accenture.com/t20180503T034117Z__w__/us-en/_acnmedia/PDF-77/Accenture-Pulse-Survey.pdf*
[4] *Ibidem.*

II. LITERATURE REVIEW

Privacy concerns, personalization and their impact on advertising have been researched intensively during recent years as the topic became increasingly important and relevant, but there are still areas and topics that need further studies and analysis. In this section, we will go through a number of studies and publications that heavily influenced and contributed to my researches.

Tucker (2014) investigated how the perception of control of internet users over their private data and their privacy can affect the effectiveness (click-through rate) of advertisements, expanding previous research by Fournier and Avery (2011) in which it has been emphasized that to succeed and to plan effective advertising plans, firms must give up control in favour of users. Tucker's research expands such findings by underlining that to succeed, online platforms and media need to give control over privacy settings to their communities if they want to use user data to personalize their advertisements.

Schumann, Wangenheim, and Groene (2014) in their research about social norms, reciprocity, privacy concerns, advertising effectiveness, and user-generated content found out that customers can treat and accept personalized advertising as an exchange, where the trade is between user's data and private information and website's free service. Targeted advertising can be seen as an online currency, used to repay the website for the customization and other benefits.

Bilchev and Marston (2003) introduced the concept of a distributed user profile, examining its usage for the purpose of personalized advertising, researching implications and consequences for privacy.

Galàn-Garcìa, Gómez, and Bringas (2012) introduced in their study a more efficient way to collect users' data in order to develop and plan more effective and personalized advertisements.

Furthermore, Goldfarb and Tucker (2010) in their study about how law and regulations about privacy can impact advertisement effectiveness, found out that after bills that restricted the use of data for marketers were introduced, effectiveness decreased and announcements were less likely to stimulate a response.

Again, Goldfarb and Tucker (2010b) researched online display advertising finding out that matching an advertisement to site content and enhancing an advertisement’s

obtrusiveness independently increase purchase intention. But, in combination, the two strategies are not effective.

Smith et al. (1996) developed and validated a scale that identifies and measures the primary dimensions of individuals' concerns about organizational information privacy practices, allowing scholars to study the degree of privacy concerns of an individual.

Again, regarding privacy concerns, studies by Graeff and Harmon (2002), Chellappa, R.K. & Sin, R.G. (2005), Culnan, M.J. (1993), and Greenberg, P.A (2000), are of particular interest.

Davenport and Bean (2018) analyzed the trend of analytics adoption by big companies, finding out that they are actually making the effort to keep with innovation but are struggling to create a data-driven culture that is spread among the firm.

Won Kim (2002) researched the personalization phenomenon, starting from its different definitions, its current status and next steps ahead, providing challenges for future development and techniques used in today’s environment.

Ramalingam et al. (2018) in their study aimed to research Artificial Neural Networks as a measure of TV broadcast advertisements effectiveness, defining influential and important factors.

Shah et al. (2011) tried incorporating brand elements (brand image, attitude, and attachment) with environmental consequenced in order to define and study the impact on the consumer purchase intentions. They found out that these elements do have a positive impact, while environmental consequences have a negative effect on some consumers.

In the study conducted by Mirabi et al. (2015) factors affecting customers, purchase intention has been deeply analyzed, coming to the conclusion that product quality, brand advertising, and the name had the highest impact on purchase intention, while packaging and price weren't significantly influential.

Furthermore, in Jain and Mishra (2015) about Privacy Concerns of Indian Online customers the analysis of different elements and their relationship affecting the degree of privacy concern of the users resulted of particular interest for this research, stressing once again the importance of deeply dissecting privacy concerns and its "layers".

Again on the privacy topic, Buchanan et al. (2007) defined three different scales to measure privacy concern of users and presented different uses in online researches.

Scales to assess advertisement effectiveness can be found in a variety of studies, like the one defined by Hall (2002), Sachdeva (2015) and the ones defined by Kotler and Armstrong.

Using mouse-tracking techniques, literature regarding the matter has been used as a starting point, with particular attention to Freeman (2010), Calluso (2015), Chen (2001) and Navalpakkam and Churchill (2012).

A comprehensive list of all the papers mentioned in this section can be found at the end of this research.

Main contribution of the research

The contribution of this research to the abovementioned literature regards the main issues covered in the previous section – privacy, advertising context, personalization and data management – with a specific focus on the topics not thoroughly researched like the impact of "Advertisement Personalization" and "Degree of privacy concern" on "Advertisement effectiveness" in different contexts – if the advertisement is presented in a "Commercial" environment or in a "Non-commercial" one – a variable that has found less space compared to the former.

Moreover, of particular interest for the research is the usage of mouse-tracking techniques, which represents a rather young and rising way to analyze individuals' behavior.

III. THESIS

1. Theory & Hypothesis

1.1 Data-driven organizations: processes and culture

As time goes by, all major industries are starting to become data-driven. They started understanding the enormous power of decisions supported by data, trends research and statistical analysis, but what does data-driven exactly mean and why are data useful? Data are defined as "information, facts or numbers, collected to be used to help decision-making"[5]. So, companies that are data-driven, or define themselves as such, try to make decisions based on relevant and timely information, potentially allowing them to create a competitive advantage over their competitors.

The results of a study conducted by NewVantage Partners[6] clearly shows how the importance of data and analytics is actually rising at a very rapid pace year after year and how managers are starting to focus on exploiting these opportunities, even though there's still a lot to do. First of all, the main issue is related to the shift from a standard culture to a data-related one. This step is usually very difficult for big and established companies, while recent start-ups are already embodied with it from the start. Huge corporations usually try to embrace the change in appointing new roles, dedicated to the task (chief data office, analysis managers, information managers, etc.). "Virtually all respondents (99%) say their firms are trying to move in that direction, but only about one-third have succeeded at this objective".[7] Handling the transition will be one of the most important and challenging tasks of next years and will be the battleground where future unicorns[8] will put down roots for their long-lasting success.

Having understood that an important transition is now happening in the business world, we can briefly discuss why data are important in a pragmatic way and how companies actually use data, to then move on to web personalization.

[5] Cambridge Dictionary, https://dictionary.cambridge.org/dictionary/english/data
[6] New Vantage Partners, *Big Data Executive Survey*, 2018
[7] Davenport H. T., Bean R.*, Big Companies Are Embracing Analytics, But Most Still Don't Have a Data-Driven Culture, Harvard Business Review, 2018*
[8] Definition of Unicorn (finance): https://www.investopedia.com/terms/u/unicorn.asp

According to SAS, data management is important because it “guarantees that data is accurate, aligned with business objectives and used to drive better business decisions.”[9] In fact, when data management is on point, data and knowledge can move efficiently between different units or systems, ensuring timely reactions and the correct execution of processes, that can then be standardized and enriched, making data more usable and exploitable for the whole organization. This cycle can then develop into practices of knowledge and information management, especially important for big corporations where the effective spread of data among employees is crucial on different layers and can guarantee a competitive advantage in the market.

The need to establish correct data collection, management, and analysis processes has led to the rise of data mining practices, consisting of extracting from huge databases knowledge and insights that can be of value to marketers or other professional figures. Data Mining has been defined as "the analysis of (often large) observational data sets to find unsuspected relationships and to summarize the data in novel ways that are both understandable and useful to the data owner".[10]

[9] SAS, Data Management Insights, 2018, https://www.sas.com/content/dam/SAS/en_us/doc/other1/data-management-why-is-it-important-107421.pdf
[10] Hand et al., *Principles of Data Mining*, MIT Press, 2001

1.2 The “Hyper-personalization” phenomenon

Following the outbreak of the Internet, the importance of data in the business world has been steadily on the rise since the early ‘00s, going along with another very important trend: web “personalization". The term itself "is used in the context of receiving from a large body of information only the part that is of interest to an individual or a group of individuals"[11], but it can be narrowed down in one-to-one marketing, with examples like: “displaying certain products or services or information on a web page that may be of potential interest to a particular website visitor as soon as he/she visits the page; identifying potential customers of a new product from all existing customers, and sending them promotion materials or offering promotional deals"[12].

Personalization is not an Internet-exclusive phenomenon. Since the origins of business, every salesman remembers his best customers and tries to serve them in the most satisfying way possible; every owner of a store knows his regular customers and their preferences, exploiting this knowledge to extract more value from them. The last development of this phenomenon is the shift from the offline to the online world, where the number of customers grows exponentially and data becomes the new currency.

"If you are not paying for it, you're not the customer; you're the product being sold”[13].

This famous quote seems to describe well the value shift happened during the last decades. As we already told, data is becoming the new currency and gathering sensitive information from users seems to be the new “Gold Rush”.

Rust et al. (2002) back this up in his research regarding privacy over the Internet, in which he "even argued that the Internet will inevitably cause individual privacy to disappear and that a specialized market for privacy will emerge.[14] In other words, consumers may have

[11] Kim W., *Personalization: Definition, Status, and Challenges Ahead*, 2002
[12] *Ibidem*
[13] Lewis A., *Metafilter discussion about User-driven* content, 2010, https://www.metafilter.com/95152/Userdriven-discontent#3256046
[14] Rust, R. T., P. K. Kannan, and N. Peng, *The customer economics of Internet privacy,* Journal of the Academy of Marketing Science, 30, 455–464, 2002

to pay for a certain degree of comparative privacy in the future, but the underlying degree of privacy will continue to be eroded."[15]

This two phenomena, data-driven decisions, and web personalization have evolved into what today is being called "Big Data". Big Data is defined as "extremely large data sets that may be analyzed computationally to reveal patterns, trends, and associations, especially relating to human behavior and interactions"[16]. Usage of Big Data led to an increase in efficiency and efficacy of data collection, analysis and decision-making.

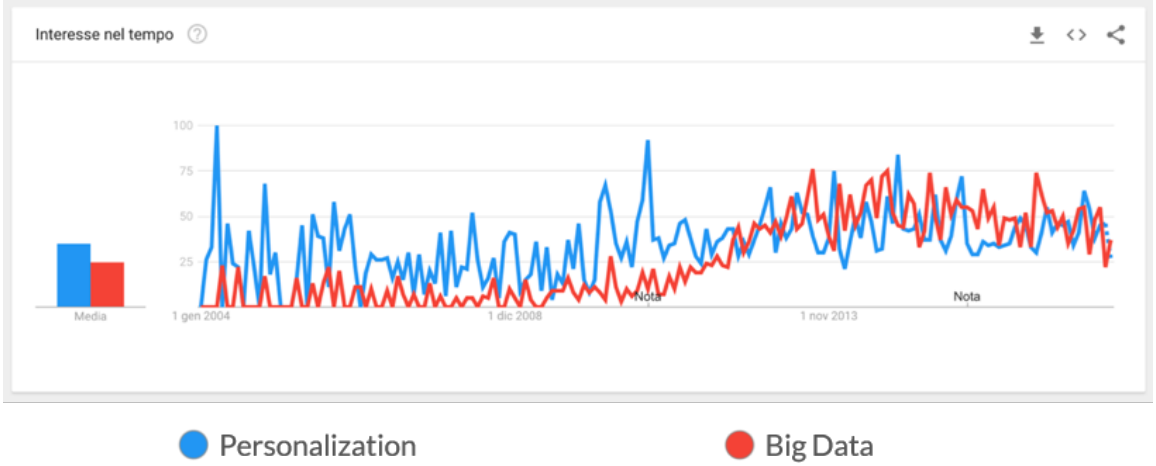

Figure 1 - [Google Trends]: As shown in the picture, the Personalization and Big Data trend grew together since April 2012 – data shown from 1/01/2004 to Present, relative to the US Market.

Interest shown in this sector resulted in business and marketing methods that today are considered best practices: the development of buyer personas with detailed and granular information about customers, tracking of visitors over different session with cookies, remarketing strategies that let advertisers follow prospects or lead across their navigation on the web, clustering and data mining.

But why events and innovations of the early 2000s brought us up to this point? The reasons why is deeply linked to the necessity of companies to survive recessions, economic crisis, and alarming customer churn rates. The Y2K bubble and the DotCom

[15] Nam et al., *Consumers' Privacy Concerns and Willingness to Provide Marketing-Related Personal Information Online*, in NA - Advances in Consumer Research Volume 33, eds. Connie Pechmann and Linda Price, Duluth, MN: Association for Consumer Research, Pages: 212-217, 2006

[16] Oxford dictionary, https://en.oxforddictionaries.com/definition/big_data

crisis put the “Needed Innovation” status of the Internet and of the Web at risk. A status that was quickly regained as usage of internet, social media and web-provided services started to spread and grow exponentially.

Personalization, Big Data, and One-to-one Marketing allow managers to deliver better services to an audience of interested people at the right moment, creating a positive loop of satisfied customers and healthy companies.

But as we already stated more than once, the present advertising environment is the result of years of change, innovation and points proven with failures and successes. "Today's consumers are exchanging substantial company- and/or brand-specific information online and it is incontestable that interactive social media influence consumer choices"[17].

[17] Sands, S.; E. Harper and C. Ferraro, *"Customer-to-noncustomer interactions: Extending the 'social' dimension of the store environment," in Journal of Retailing and Consumer Services, Vol. 18 (5), 438-447,* 2011

1.3 Personalization in advertisement: a cursed necessity

But how this rolls out in practice? How personalization actually affects advertisement and in equal way advertisers? In this section we will answer this questions, analyzing the different variables that compose our model. We will start by defining "Advertisement personalization".

Advertisement personalization

New media allowed companies to "exploit consumer data to present their users with relevant and personalized advertisement"[18], but the degree of personalization can actually be classified in different stages. Literature that takes into account this variable often lacks a detailed definition of these stages, and for this reason, we will try to be as thorough as possible in defining the different possibilities that marketers have, later assessing which one has been taken into account for this research. For reference, the baseline of this work comprehends information and similar classification as defined by the "Advertising Personalization Classification System"[19].

- **First stage: Geo-Personalization**

The first layer of complexity that marketers usually take into account in designing personalized advertisement is the geographical position of their target audience: regional or seasonal products (winter clothes in cold regions, sunscreen in hot ones) or products linked and advertised accordingly to the specific country/region/city. Either offline or online, this first stage of advertisement personalization has different critical weaknesses: for instance, it doesn't intercept an intent, it can't be shown to people interested in that specific product and it produces generic segments of consumers.

- **Second stage: Demographic personalization**

Advertisement personalized with demographic data raise the bar of complexity, allowing marketers to further identify clear demographic clusters, defined by age, gender, relationship status, education, income, and more. This information can later be used to

[18] Tucker C., *Social Networks, Personalized Advertising, and Privacy Controls, in Journal of Marketing Research 51, no.5, 546-562*, 2015

[19] Quick T., *Advertising Personalization Classification System*, 2017, https://medium.com/@tysonquick/the-advertising-personalization-classification-system-4ea1dd794d19

plan a focused promotional campaign around events or holidays (the most common example is Valentine's Day, followed by Halloween). But again, this kind of personalization doesn't really intercept a desire, a strong intent, but rather a demographic "situation" or a sociological phenomenon.

- **Third stage: Intent/interests personalization**

Intentions, interests, and desires are shown through actions and words, both in offline and in the online world. Actions link us with other people, explaining our thoughts and desires. They also reflect our decisions, and thus our wishes. Thanks to the technological development of the last decade, we are now able to identify, capture and analyze these interactions, gaining a huge competitive advantage over competitors and over our own customers. The most common examples here are social media interactions or searches done on a search engine.

Here is where the big rupture happens: the action, the interaction, are a clear representation of what consumers want or in what products they are actually interested in. There's a shift from the marketer perspective to the consumers' one that allows marketing researchers, managers or analysts, to think in a completely different way how to market a product. Leaving aside disruptive products that actually create a new need in consumers' mind, marketing is now becoming a way to satisfy in the most complete way consumers need, intercepting the most possible portion of intent and interest in the target population.

- **Fourth stage: Hyper-Personalization, Programmatic delivery**

As a sum of the previous three stages, a fourth one can be defined. Hyper-Personalization can be defined as the practice to deliver a message that a customer very likely wants to see, on the channel he prefers the most, at the most suitable timing to convince him to purchase our product. This is possible by combining geographical data, intent and behavioral patterns and consumer's history. This is the apex of Retargeting and Remarketing, usually delivered through programmatic platforms which allow marketers to bid in real time for media buying, presenting to customers the most suitable advertisement at the right moment. When marketers can rely on high-quality data sets or information about their customers, programmatic delivery can make a huge impact on

company sales: being able to target specific audiences and demographics can reduce "noise" and wasted expenses, as demonstrated by the BCG in their analysis on "programmatic guaranteed", which explained the practices of automating some of the marketer tasks, in favour of efficiency.[20]

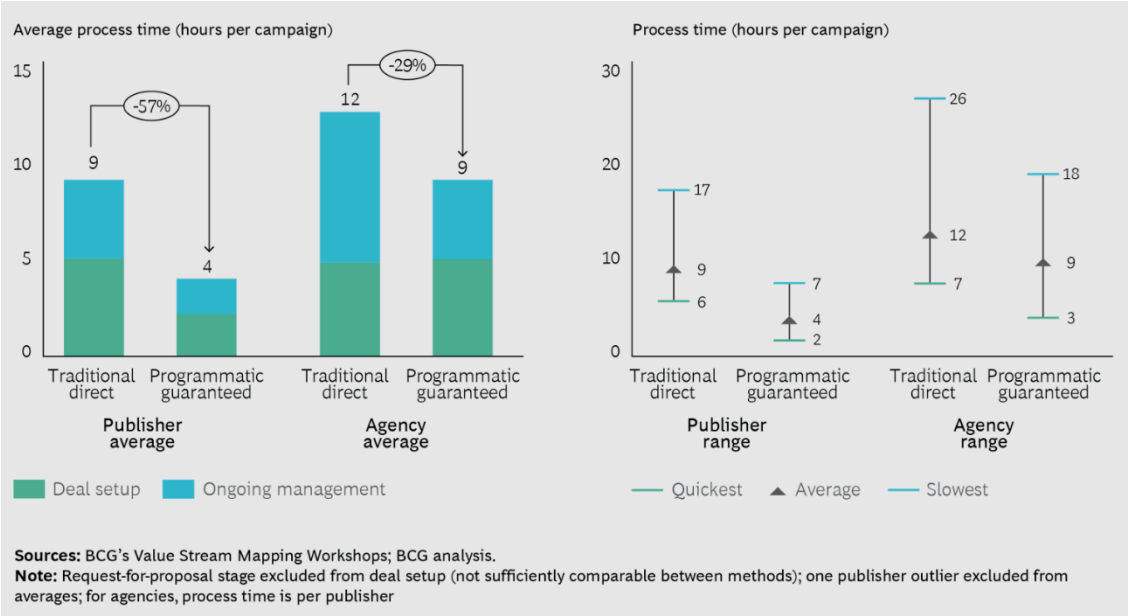

Figure 2 - [Boston Consulting Group] As shown in the picture, the BCG found out that "compared with traditional direct, programmatic guaranteed brought 57% time savings for publishers and 29% for agencies", clearly a big leap in efficiency.

In this research we will take into account practices belonging to Stage Three of Ad Personalization, as we will consider answers from a survey that will give us some insights on respondents preferences and intents, that will be later assessed, confirming or not their choices, in a mouse tracking experiment.

Advertisement effectiveness: definition and measurements

The concept of effectiveness relates strongly to what originally is intended as the original goal. Advertisement effectiveness can be defined as "how and in what degree advertising accomplished its purposes". Purposes can be different, spacing from Brand Awareness and Reach to Sales, Conversions, and Profits. Each campaign has different purposes, and as marketers, we should be able to define and analyze the correct metric, specific for each scenario.

[20] https://www.bcg.com/it-it/publications/2018/guaranteed-opportunity-programmatic-advertising.aspx

In previous literature, effectiveness has been measured in different ways: Artificial Neural Networks[21], Mouse Trajectory[22], Purchase Intention, Clicks, and ultimately, Conversions. In this section we'll focus on the last four, leaving aside Neural Networks.

- **Purchase Intention**

Purchase intention is a kind of decision-making that studies the reason to buy a particular brand by consumer[23], Morinez et al. (2007) define purchase intention as a situation where consumer tends to buy a certain product in certain condition[24]. Related to advertisement effectiveness, marketers goal should be influencing and increasing consumers' purchase intention with effective advertising.

- **Clickthrough rate/Clicks**

Clickthrough rate (CTR) can be defined as "the average number of click-throughs per hundred ad impressions, expressed as a percentage".[25] Related to advertisement effectiveness, it can be defined as how persuasive advertisement is to consumers, measured by the number of clicks it receives. Practices used to increase CTR are deeply rooted in neuromarketing and psychology, as marketers test every element of their advertisement that consciously or unconsciously influence potential customers (i.e. different headlines, different images, different colors, personalization, etc).

- **Conversions & Sales**

Conversion, or conversion rate, is related to the amount (or percentage) of consumers that take the desired action.

Sales clearly refer to the number of products purchased by customers.

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[21] Ramalingam, V., Palaniappan, B., Panchanatham, N. and Palanivel, S., *Measuring advertisement effectiveness—a neural network approach*, 2018

[22] Navalpakkam V., Churchill E., *Mouse tracking: measuring and predicting users' experience of web-based content,* 2012

[23] Shah, H. et al., *The Impact of Brands on Consumer Purchase Intentions*, Asian Journal of Business Management 4(2): 105-110, 2012

[24] Mirabi V. et al., *A Study of Factors Affecting on Customers Purchase Intention,* Journal of Multidisciplinary Engineering Science and Technology 2(1): 268, 2015

[25] Marketing Terms, Definition of Clickthrough rate, https://www.marketingterms.com/dictionary/clickthrough_rate/

- **Mouse Trajectory**

"Hand motions, tracked by a mouse, wireless remote or position sensor, have been used to track the evolution of users' commitments to different choice alternatives."[26] Mouse trajectory and its tracking have been recently used to assess and extract different insights and to determine the best alternatives for advertisements based on users' behavior. For mouse, trajectories are possible to track: acceleration, speed, deviation from the best path, AUC (area under the curve), relating them to advertising effectiveness in different ways.

Degree of privacy concern

Before defining the Degree of privacy concern, we will briefly review the concept of privacy. Nam et al. (2006) took into account two different points of views to define it: the first one regards the concept at its core, while the second one is more related to the intrusiveness of Internet in people's sensitive information. "Privacy is often understood as the right to be left alone[27]. The invasion of privacy on the Internet is commonly regarded as the unauthorized collection, disclosure, or other use of personal information[28]".[29]

Phelps et al (2000) issued that privacy concern of customers can differ significantly among individuals. Changes are usually explained with cultural and demographic differences (Berendt et al., 2005, Hann et al., 2007, Milne and Bahl, 2010).[30]

As Buchanan et al. wrote in their research about privacy concern: "concern for privacy is a subjective measure—one that varies from individual to individual based on that person's own perceptions and values. In other words, different people have different levels of concern about their own privacy."[31] In this research we hypothesize an effect of privacy

[26] Navalpakkam V., Churchill E., *Mouse tracking: measuring and predicting users' experience of web-based content,* 2012
[27] Cheskin Research and Studio Archetype/Sapient, *eCommerce trust study*. Redwood Shores, CA: Cheskin Research, 1999
[28] Wang, H., M. K. O. Lee, and C. Wang, *Consumer privacy concerns about Internet marketing Communications of the Association for Computing Machinery*, 41, 63–70, 1998
[29] Nam et al., *Consumers' Privacy Concerns and Willingness to Provide Marketing-Related Personal Information Online*, in NA - Advances in Consumer Research Volume 33, eds. Connie Pechmann and Linda Price, Duluth, MN: Association for Consumer Research, Pages: 212-217, 2006
[30] Jain T., Mishra P, *Dimensions of Privacy Concerns amongst Online Buyers in India*, 2015
[31] Buchanan et al., *Development of Measures of Online Privacy Concern and Protection for Use on the Internet*, 2007

concern on advertisement effectiveness, varying in magnitude according to the degree of the concern.

Advertisement context (Commercial/ Non-commercial)

Advertising context has been previously studied in the literature, and there are different studies of particular interest, especially for the purpose of this research. Kirmani and Yi's provides an interesting point of view on the effect of context on consumer responses. They take into account the definition of "Advertising context" provided by Soldow and Principe in their 1981 research[32]: "Many advertisements do not occur in a vacuum, but rather appear simultaneously with other materials such as programs on TV, articles in magazines, ads for other products, and station identifications. Such material within which ads are embedded is usually referred to as advertising context".[33] For the sake of this research, we have taken into account two specific types of contexts: "Commercial" (i.e. Amazon) and "Non-Commercial" (i.e. Facebook). We define "Commercial" as a "clear sales environment, with the sole purpose of selling products or to be the container of an advertiser's message; a context that a user can recognize as a marketplace or a shop" and "Non-commercial" as an "environment that can or cannot be related to products sales; a context that does not have as its own core purpose to sell products".

[32] Soldow and Principe V., *Response to Commercials as a Function of Program Context,* Journal of Advertising Research, 21 (2), 59-65, 1981
[33] Kirmani A. and Yi Y, *The Effects of Advertising Context on Consumer Responses*, 1991

1.4 Research questions & Hypothesis

The research objective of this thesis is to investigate and comprehend the impact that the personalization of advertisements and one's degree of privacy concern has on advertisement effectiveness whether it is presented in a commercial environment or in a non-commercial one.

The following research questions have been defined in order to study the matter:

- RQ1: How does advertisement personalization affect advertisement effectiveness?
- RQ2: How does the degree of privacy affect advertisement effectiveness?
- RQ3: How does the advertisement context affect advertisement effectiveness?

The following hypothesis has been formulated in order to answer research questions:

- H1a: Advertisement personalization will have a positive effect on Advertisement effectiveness in a commercial environment, which will be greater than the effect in a non-commercial one.
- H1b: Advertisement personalization will have a positive effect on Advertisement effectiveness in a non-commercial environment, which will be smaller than the effect in a commercial one.

We expect that the personalization positive effect will be greater in commercial environments because it intercepts a strong purchase intent and will with more probability be embraced by the potential customer.

- H2a: Degree of privacy concern will have a negative effect on advertisement effectiveness in a commercial environment, which will be greater than the effect in a non-commercial one.
- H2b: Degree of privacy concern will have a negative effect on advertisement effectiveness in a non-commercial environment, which will be smaller than the effect in a commercial one.

We expect that the privacy concern negative effect will be greater in commercial environments rather than in non-commercial ones, considering that people are often more aware of giving up their personal information in social environments like Facebook.

2. Methodology

To test the hypothesis of this research and to answer research questions, correlation analysis, MANOVA and multiple regressions have been conducted on the collected data. "Advertisement effectiveness" has been taken into consideration as the dependent variable, split in the two considered environment – or "Contexts" – Commercial and Not commercial.

"Advertisement personalization" has been taken into consideration as the first independent variable.

"Degree of privacy concern" has been taken into consideration as the second independent variable.

In order to measure Advertisement Effectiveness, an open-source software developed by Jon Freeman called MouseTracker has been used. MouseTracker is "a software package that allows researchers to measure real-time hand movements from the streaming *x*-, *y*-coordinates of the computer mouse [...] and subsequently visualize, process, and analyze them".[34]

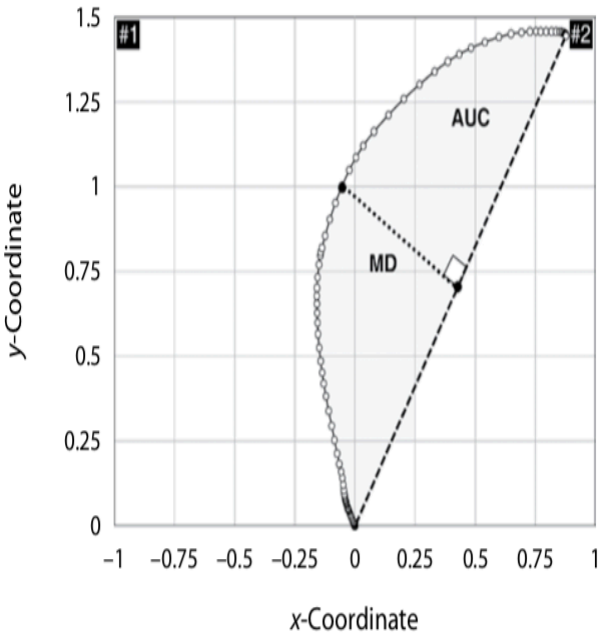


Figure 3 - [Jon Freeman]: Graphic representation of Maximum Deviation (MD) and Area Under The Curve (AUC).

Thanks to this software is possible to track and analyze mouse trajectories, calculating measures of spatial attraction to the opposite response alternative, called maximum deviation (MD) and area under the curve (AUC). For a clearer representation, use as reference the figure on the left. Higher the maximum deviation, the more the tracked trajectory moved toward the opposite alternative. The area under the curve "represents the geometric area between the actual trajectory and the idealized

[34] Freeman B. J., Ambady N., *MouseTracker: Software for studying real-time mental processing using a computer mouse-tracking method,* Behavior Research Methods, 42 (1), 226-241, 2010

trajectory (straight line). The area on the opposite side of the straight line is calculated as negative area."[35]

Data obtained by the experiment has been cleaned and run through STATA for analysis.

2.1 Data collection

Collection of data regarding "Degree of privacy concern" has been done by conducting a survey among a random sample of respondents. The survey has been carried on Qualtrics and was: sent online to respondents, done by colleagues at my workplace on my personal laptop, by fellow students at my university on my personal mobile phone and by relatives at my home. The last three ways were necessary in order to do the consequent experiment with mouse tracking technique. The "Degree of privacy concern" has been assessed using the scale about "Personal information" defined by Smith in its research.[36]

During the same survey, data for the personalization of the advertisements have been collected. This data have then be used in a second stage of the research, where subjects underwent a "mouse trajectory tracking" experiment.

In the experiment, selected subjects have been presented with an advertisement and two response buttons. The advertisement could have been randomly personalized (based on subject preferences) or not personalized; the personalization has been done in regards to data collected from the surveys. From the start until the end of the trial, data will be collected.

Data regarding mouse movements and individuals' behavior has been collected using MouseTracker, a software by Jon Freeman.

Data regarding advertisement context has been collected alongside the mouse tracking process, offering respondents the possibility to choose in a scenario with different characteristics: different logos have appeared alongside presented advertisements, in order to define the context as "Commercial" or "Non-commercial".

[35] *Ibidem.*

[36] Smith H. J., *Information Privacy: Measuring Individuals' Concerns About Organizational Practices*, 1996

2.2 Study design

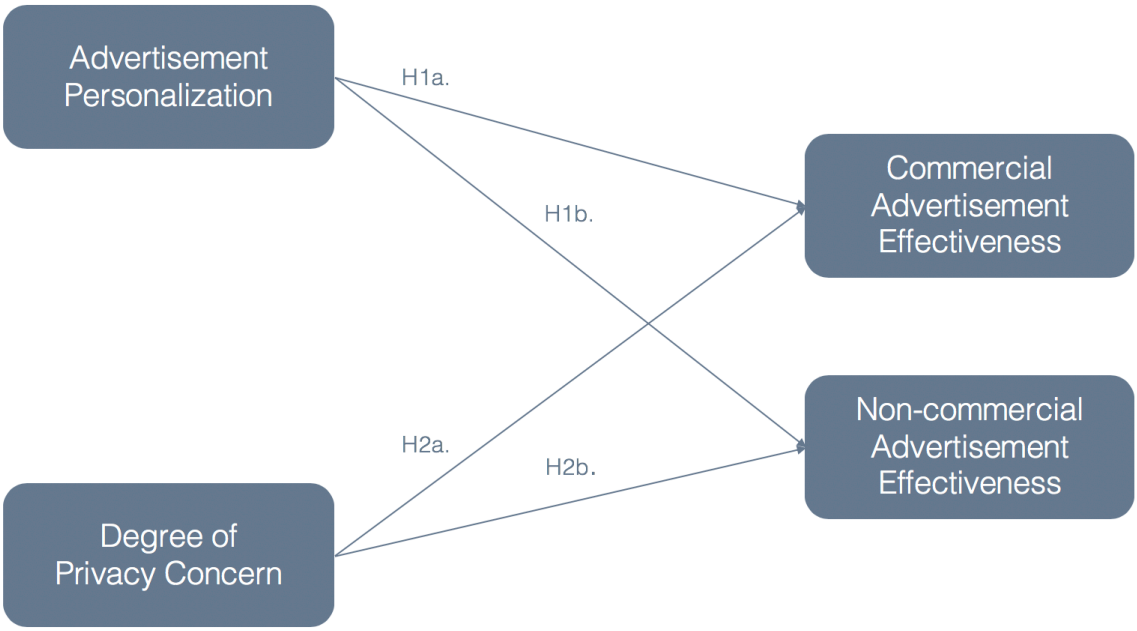


Figure 4 - Research model.

As shown in the picture, this research has been developed around a four-variables model. "Commercial Advertisement effectiveness" and "Non-commercial Advertisement effectiveness" are the dependent variable, while "Advertisement Personalization" and "Degree of privacy concern" are independent variables.

The research is designed to assess the relationship the variables and explain the impact of "Advertisement Personalization" and of the "Degree of Privacy Concern" on "Advertisement Effectiveness", taking into account this effectiveness in two different contexts. In fact, the "Commercial" and "Non-Commercial" adjunct in the dependent variables do not refer to the advertisement itself but explains the environment in which it is presented.

As said before, the Degree of Privacy Concern has been assessed with answers collected from a survey. The scale used in the survey was already defined in the literature by Jeff

Smith, who explained its development in-depth in this publication.[37] The scale is composed of 15 items. These items identify four sub-scales that assess four macro-area of privacy concern and privacy practices. Although the scale was tested and validated, in the analysis part we will see that reliability and validity analysis was conducted to further determine the coherence and the relevance of the topic at hand of the scale.

Figure 5. Example of Non-commercial Advertisement.

The experimental part was designed starting from the survey responses. The last two questions of the survey regarded the choice of three common items that the respondent preferred or would have liked to buy, according to his preferences. In order to cover the totality of possible combinations, fake advertisements for every response were designed and put in the two relevant contexts – Amazon and Facebook.

The experiment was performed in a controlled environment, with no distractions or external stimuli. Each experiment was conducted on a Windows Surface laptop, with the same equipment (mouse) for every trial. Before each experiment, the subject received a short brief and a set of behavioral rules he had to follow in order to ensure the success of the process. Each experiment consisted of 14 trials. In each trial, the subject was presented with a page that had three buttons: one saying "Yes" in the top-left corner, one saying "No" in the top-right corner and one saying "Start" in the bottom-center part of the screen. After pressing "Start" subjects were immediately presented with a visual stimulus (see Figure 5, 6) and had to immediately move the mouse toward an answer ("Yes"/"No") trying to answer to the main question of the experiment: "Would you buy the item presented in the advertisement?". Stimuli

Figure 6. Example of Commercial Advertisement.

[37] *Ibidem.*

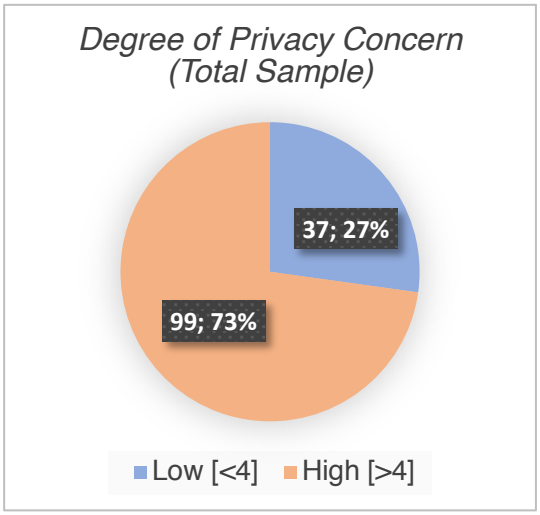
were presented in a random order in every experiment and each subject had his own particular combination of “Personalized Advertisements”, even though the design of presented advertisements was always the same.

The experiment allowed us to gather data that was later used during the analysis: Maximum Deviation, Area Under the Curve, Reaction Times and Advertisement effectiveness in different contexts (number of time an advertisement made the subject press “Yes”).

2.3 Data description

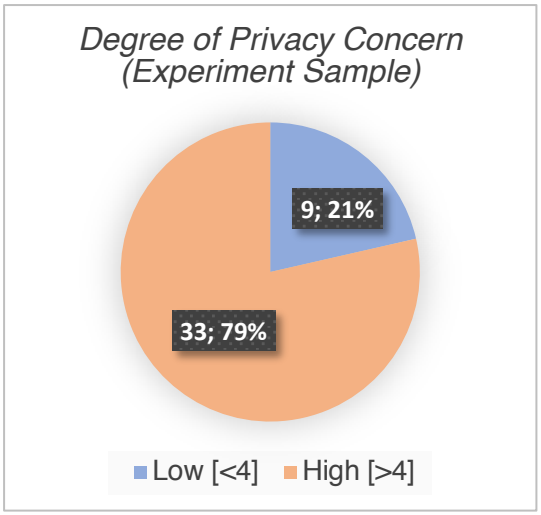
The survey was filled by 136 people. 67 (49.26%) resulted female and 69 (50.74%) male The majority of the sample was between the 19-25 age range (86, 63.23%), followed by the 26-35 range (31, 22.73%) and the 36-50 range (9, 6.6%).

Regarding education levels, 54 (39.7%) respondents had a Bachelor's Degree, 33 (24.26%) had a Master's Degree, while only 2 (1.47%) had a Ph.D. Remaining 44 (32.35%) respondents had High School Diploma, while 3 (2.20%) had only Primary School Diploma.



Regarding the "Degree of privacy concern", it is possible to describe individual levels of concern by taking into account the average score of the 15-item scale. This has been done after testing the reliability and validity of the scale and retaining all the 15 items for the evaluation of the final mean. As the scale is a Likert one, with seven options to assess agreement or disagreement, we can take the value "4" as the Neutral one (In the survey it was presented as "Indifferent"). A mean score of exactly 4 would then signify indifference to the privacy subject.

Out of the 136 people, 37 resulted having a score lower than 4, with a minimum of 2. The remaining 99 resulted having a score higher than 4, with a maximum of 6,8. Out of the original sample, 42 respondents were selected to undergo the second step of the study: the Mouse Tracking Experiment. The sample was not selected following a particular ratio but was conditioned by subjects availability. Regarding the experiment sample, 33 respondents had an average value for Privacy concern higher than 4, while the remaining 9 had a value lower than 4.



During the experiment I was able to gather data about Reaction Times, Maximum Deviation from the unselected response, Area Under the Curve, Errors from the expected answer and the answers from the default question of the experiment ("Would you buy the item presented in the advertisement?"). The answers have been split between contexts and between the type of advertisements, whether they were personalized or not.

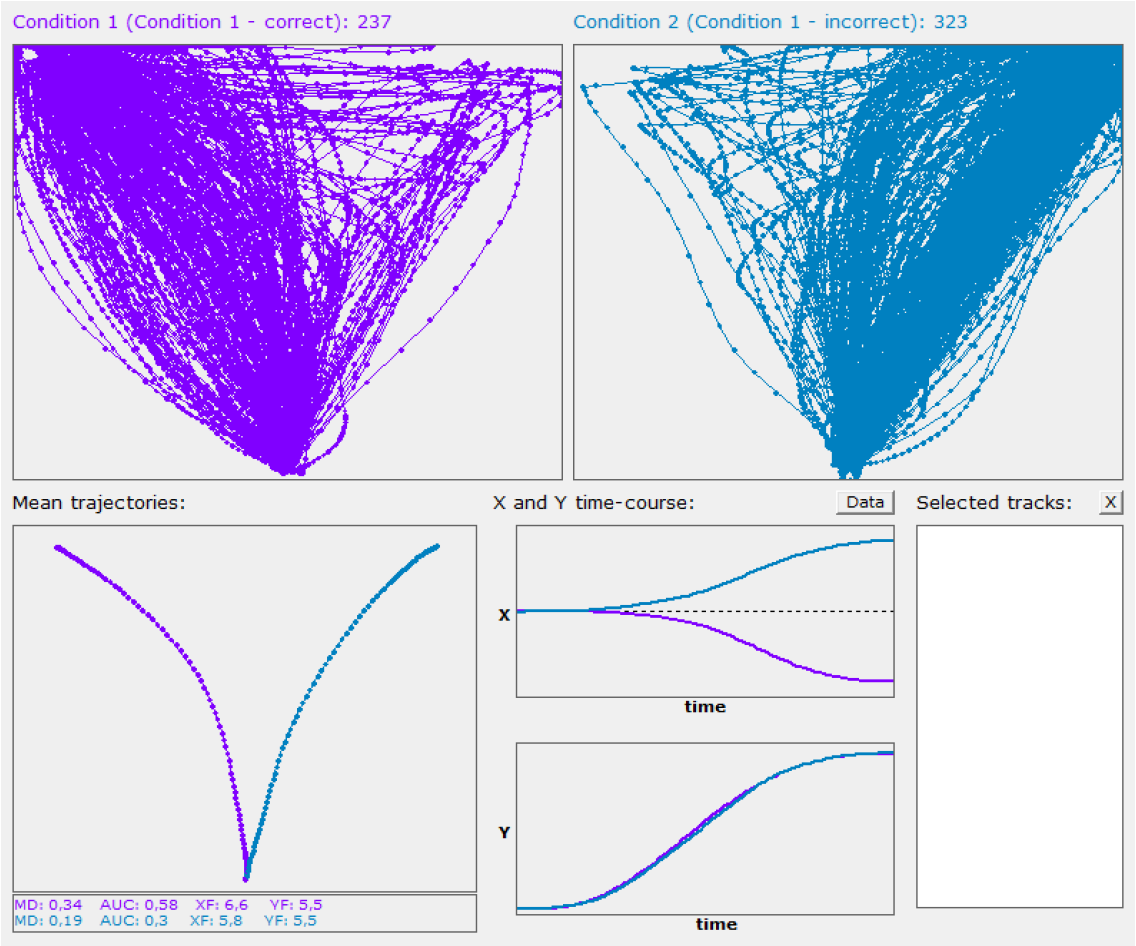


Figure 7 - Mouse tracking data visualization.

After the collection of data, data cleaning processes have been conducted. Because of incomplete or corrupted values, two experiments data were dropped from the final research.

2.4 Data analysis and results

In this section, we will go through every step that followed the collection of the research data.

Reliability of scale and Factor Analysis

First of all, to define the “Degree of privacy concern” I took into account data collected with the survey. Even though the scale was already defined valid and reliable in literature, to further confirm the reliability of the used scale I used Cronbach’s Alpha statistical index, the most common index to assess internal consistency of a scale. The coefficient for scale reliability resulted being 0.94. Not only this score defines our scale as "Acceptable" but is an index of high internal consistency.

Furthermore, in order to determine the dimensionality of the scale, I conducted factor analysis, determining that the whole 15 item could be retained in order to define the "Degree of privacy concern" of respondents.

In order to do so, as already described in the data collection section, we calculated the average score of every respondent by simply determining the mean value of the 15 scale items. This score was later used as our "Degree of privacy concern" variable during further analysis.

Correlation analysis

To determine the strength of a possible connection between our variables, Pearson's correlation analysis was conducted. The variables taken into account for the Correlation Matrix were the "Degree of privacy concern", "Advertisement Personalization", "Commercial Advertisement Effectiveness" and "Non-commercial Advertisement Effectiveness".

The results are presented in the following table:

	Privacy concern	Commercial Ad Effectiveness	Non-commercial Ad Effectiveness	Ad Personalization
Privacy concern	1.000			
Commercial Ad Effectiveness	**-0.3366*** **0.0293**	1.000		
Non-commercial Ad Effectiveness	**-0.4707*** **0.0017**	**0.4072*** **0.0074**	1.000	
Ad Personalization	0.0731 0.6455	0.0803 0.6132	-0.0136 0.9319	1.000

Figure 8 - Correlation analysis results. (= Significant at p < 0.05)*

The most notable result is the significant correlation between the "Degree of Privacy Concern" and "Advertisement Effectiveness", both in a Commercial and Non-commercial context. (0.0293, $p < 0.05$; 0.0017, $p < 0.05$). This is a strong indicator that the path we hypothesized during the research questions has its justified reasoning, and it is moreover made stronger by the fact that the relationship is negative and rather strong. The effect is stronger in Non-commercial contexts (-0.4707) than in Commercial ones (-0.3366).

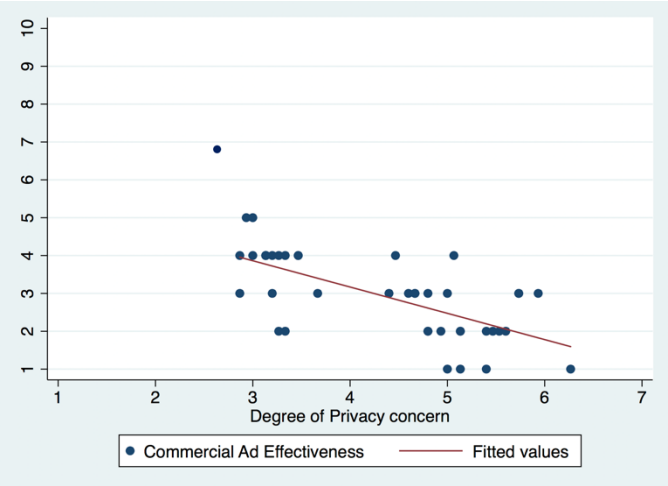


Figure 9 - Scatter plot of Privacy and Commercial Ad Effectiveness

"Advertisement Personalization" seemed to not have a direct connection with other variables taken into account, at least in Correlation Analysis.

As a first conclusion is possible to say that there is definitely a relationship between "Degree of Privacy Concern" and "Advertisement Effectiveness",

with a stronger impact in Non-commercial environments.

The relationship between "Non-commercial Advertisement Effectiveness" and "Commercial Advertisement Effectiveness" is significant (0.0074, $p < 0.05$). This association and the magnitude of the effect of other relationships can be further inspected and analyzed by taking into account consequent analysis.

Multivariate Multiple Regression

Following Correlation Analysis, to further inspect the linear relationship between the two Independent variables and the two Dependent variables, a Multivariate Multiple Regression has been conducted. As shown in the study design, "Advertisement Personalization" (as the Maximum Deviation value) and "Degree of privacy concern" (as the average score of the 15-item scale used to assess privacy concern) have been taken into account as the Independent Variables and "Commercial Advertisement Effectiveness" and "Non-Commercial Advertisement Effectiveness" have been taken into account as the Dependents. The following table contains the results of the regression.

Equation	**Obs**	**R-sq**	**P**
AdEffectComm	42	0.2220	0.0075
AdEffectNotCo	42	0.1244	0.0750

AdEffectCom	**Coef.**	**Std. Err.**	**t**	**P > |t|**	**[95% Conf.**	**Interval]**
Privacy	-.61758	.1851979	-3.33	0.002	-.9921854	-.2429893
Max Deviation	.0000177	.0001198	0.15	0.883	-0.000224	.00002601
AdEffectNoCo	**Coef.**	**Std. Err.**	**t**	**P > |t|**	**[95% Conf.**	**Interval]**
Privacy	-.41202	.1797763	-2.29	0.027	-.7756536	-.0483899
Max Deviation	.0000817	.0001163	0.70	0.487	-0.000153	.00003169

Figure 10 - Results of the first regression.

First of all, looking at the P column of the first table, we can assess that of the two univariate models, only the one with “Commercial Advertisement Effectiveness” as the Dependent variable is statistically significant, with a quite low value (0.0075, $P < 0.05$). The other univariate model with "Non-commercial Advertisement Effectiveness" as the dependent variable was not significant (0.0750, $P > 0.05$).

Taking into account the significant model, the R-sq model tells us that the two predictors taken into account explain 22% of the variance in the variable "Commercial Advertisement Effectiveness".

Regarding the predictors of the statistically significant univariate model, of the two Independent variables taken into account – Privacy and Maximum Deviation – Privacy’s effect is statistically significant (0.002, $p < 0.05$) with a quite high negative coefficient of -0.61758. Maximum Deviation effect is not significant (0.883, $p > 0.05$).

As the Correlation Analysis suggested, a relationship between Privacy and Non-Commercial Advertisement Effectiveness was found; thus we decided to further investigate it with a second multivariate multiple regression, this time taking into account only Privacy as the Independent Variable and the two Advertisement Effectiveness as the Dependents. The results are presented in the following table:

Equation	**Obs**	**R-sq**	**P**
AdEffectComm	42	0.2216	0.0017
AdEffectNotCo	42	0.1133	0.0293

AdEffectCom	**Coef.**	**Std. Err.**	**t**	**P > |t|**	**[95% Conf. Interval]**	
Privacy	-.615588	.1824301	-3.37	0.002	-.9842935	-.2468834
AdEffectNoCo	**Coef.**	**Std. Err.**	**t**	**P > |t|**	**[95% Conf. Interval]**	
Privacy	-.402798	.178155	-2.26	0.029	-.7628631	-.0427338

Figure 11 - Results of the second regression.

This time both univariate models of the multiple regression are significant, as shown in the P column of the first table (0.0017, 0.0293, $P < 0.05$).

The first univariate model, regarding Commercial Advertisement Effectiveness, shows very similar values to the first, with a similar negative coefficient but apart from that, the important difference between this and the first regression, is that, as the Non-Commercial Advertisement Effectiveness univariate model is significant, we can confirm the linear relationship between Privacy and Advertisement Effectiveness, both in Commercial and Non-Commercial cases. Moreover, the coefficient for the latter is smaller than in the former, but still negative (-0.4027).

3. Discussion and Implications

In this section I'm going to discuss the results of this research as described in previous sections, going through implications for marketers and companies.

The analysis conducted showed us that "Degree of Privacy Concern" has a significant and negative effect on Advertisement Effectiveness, both in Commercial and Non-Commercial environments. These results are in line with what we hypothesized in previous sections, in particular with H2a and H2b. In fact, privacy concerns have a greater effect in commercial environments, confirming our assumption that people are often more lenient on giving away their personal information in social environments like Facebook.

Previous literature findings defined the importance of privacy and how it can influence advertisement effectiveness, but this research findings enhance the scope of this influence, taking into account the Commercial and Non-commercial nature of the environment in which advertisements are presented. The significance of both models is an important suggestion for companies and advertisers. Remembering that companies using customers data are seeing their "productivity and profit [...] 5 to 6 percent higher than those of the competition"[38], it's important to lay out a model to enhance the usability and profitability of data, while taking into account the customer's privacy and concern about their sensitive information. Considering previous studies on the matter, this is in line with Xu et al. research about privacy concerns, assessing that it affects negatively consumer behavior[39] and with Sheng et al. findings of privacy as an antecedent belief that can have an impact on consumer's attitude and moreover their intention[40].

Regarding H1a and H1b about advertisement personalization, the models and the predictors that took into account Maximum Deviation as "Advertisement Personalization" measure were not significant. The variable value has been measured by mouse tracking, a technique that helps to measure subjects' underlying cognitive processes. A possible explanation for this non-significance can be hypothesized by taking

[38] Biesdorf et al., *"Big Data: What's Your Plan?"* McKinsey Quarterly (March), 2013
[39] Xu et al*., "Predicting the adoption of location-based services: the role of trust and perceived privacy risk"*, 2005
[40] Sheng et al., *"An Experimental study on ubiquitous commerce adoption: impact of personalization and privacy concerns"*, Journal of the Association for Information Systems, 2008

into account the fact that subjects feel and account personalization in a more rational way, rather than spontaneous. Having to start answering in milliseconds can help show and track underlying cognitive processes, but, for how the advertisements were designed and how they were presented, it probably wasn't enough to account for personalization. Even though the effect was not significant, we still think that "Advertisement Personalization" has a big impact on "Advertisement Effectiveness" and suggest follow-up researches with different techniques, in order to better investigate the relationship between this two variables; one possible method being Eye Tracking.

Considering these research findings, companies should try to be more upfront with their users in regards to how they handle privacy matters and how they manage sensitive information. Even though with the introduction of the GDPR some practices related to this matter became mandatory, not all the firms comprehend the importance of handling correctly privacy-related issues.
Companies should try to give more control over their sensitive data to users, because, as demonstrated in previous studies, "personalized advertising [...] was nearly twice as effective at attracting users [...] after the shift in Facebook policy that gave users more control over their personal information"[41]. Moreover, usage of data for personalizing advertisement should be clear and upfront, in fact, there is "no significant change in advertising that was shown to the same people but used a generic message [...], such ads do not make clear to consumers whether their private information is used to target".[42]

Regarding personalized advertisements used in our experiment, it's important to stress out that the "personalized" ads were designed starting from survey's answer, and the personalization level could have been too low to effectively impact the results of our research. This is supported by White's research about reactance to personalized content. He states that "reactance to personalized advertising is greater when the information used is more unique".[43] For further research it's advisable to take into account a more detailed

[41] Tucker C., *Social Networks, Personalized Advertising and Privacy Controls, in:Journal of Marketing Research 51, no.5, 546-562*, 2015
[42] *Ibidem.*
[43] White et al., *"Getting too personal: reactance to highly personalized email solicitations. Marketing Letters",* 2008

and deep technique to collect information to be used in the personalization process, to really stand out during the experimental part of the study.

4. Practical cases

Researches predict that the "digital environment" will reach 180 zettabytes of data – created and replicated year after year – in 2025. As the size of this universe increases, so does its value. As we already saw in previous sections of this thesis, advertisement personalization has been a huge turnaround point for companies, and it's almost a commodity. "Data-driven startups are the wildcatters of the new economy: they prospect for digital oil, extract it and turn it into clever new services, from analyzing X-rays and CAT scans to determining where to spray herbicide on a field. [...] As in oil markets, bigger data firms keep taking over smaller ones (see table). [...] Oil is the world's most traded commodity by value. Data, by contrast, are hardly traded at all, at least not for money. [...] The data economy, that term suggests, will consist of thriving markets for bits and bytes. But as it stands, it is mostly a collection of independent silos."[44]

But there are some players that are trying to change the game. The new trend, that not surprisingly follows this thesis findings, is to allow an individual to control their data assets, claiming back the value of the data they gave up to companies.

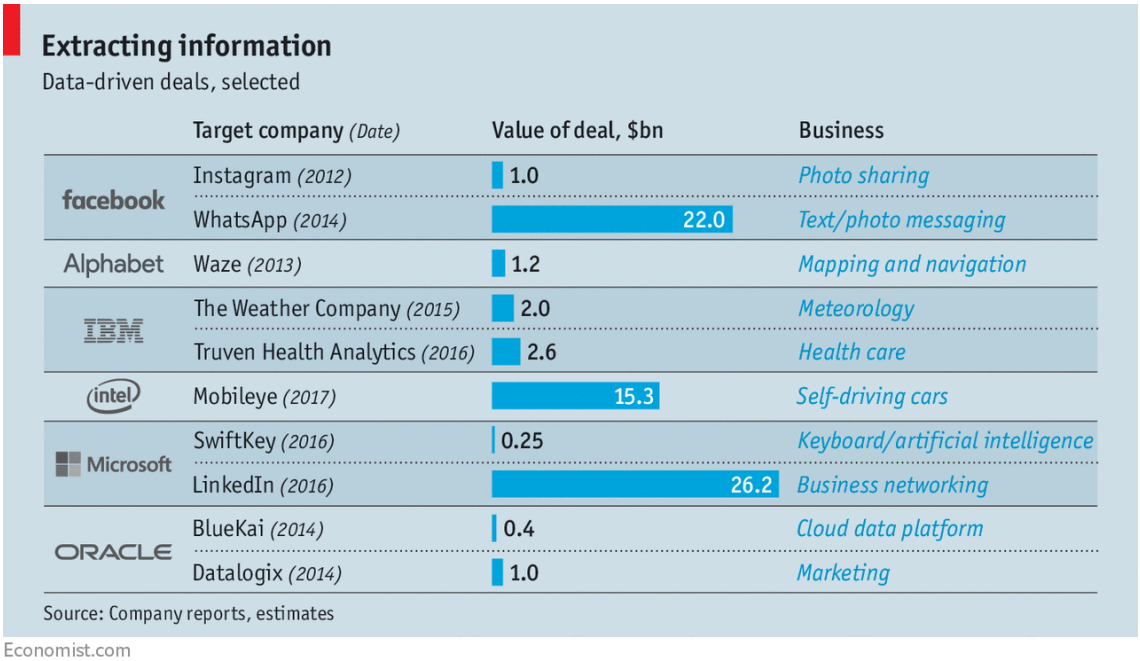


Figure 12 - Acquisition of companies related to the data economy.

[44] The Economist, *"Data is giving rise to a new economy"*, 2017, https://www.economist.com/briefing/2017/05/06/data-is-giving-rise-to-a-new-economy

Working in an agency put me in the condition to explore the depths of the privacy market, pushed in particular by the rapid growth of Ad-blocking plugins, by GDPR enforcement and by clients requests (mainly caused by panic and fear of legal backlashing). This gave me the opportunity to work on very interesting projects.

Weople

"Digital Data is strategic for companies. They own and produce value. As of today, the total value of the market in Italy is 1,6 billion, growing year over year and soon audio-video communication, still managed offline, will soon join the equation, moving rapidly towards digital channels: we are talking of 7 billion. Considering this enormous sum of money, users get none."[45]

As I said, during last year I had the opportunity to work as a Digital Marketing Specialist for a Digital Consultancy Agency. One of the projects that particularly struck my interest has been "Weople", an ambitious project that has the self-proclaimed goal to put people and their sensitive information back in the advertisement equation, giving them their share of revenue for their data. Weople has been defined as the "first bank that lets you invest your personal data, made by people, for people. An application that collects web users with the goal to value and protect data, making individuals the main characters, conscious and paid".[46]

Figure 13 - Weople logo.

Considering the results of the research presented in this thesis, this projects would seem to follow the trend of "giving back choice" to people, at least in regards of their sensitive information, with the goal of enhancing advertisement effectiveness and reducing the degree of privacy concern. This choice materializes as the possibility to earn money, prices or discounts in exchange for personal data, giving Weople back 10% of every winning as "bank costs". This is also possible thanks to the different choices and rights introduced by the General Data Protection Regulation, a new law proposed and approved by the European Union this year, on May 25th. The whole set of norms and regulations

[45] HODA, *Il dato è mio e lo gestisco io*, https://www.hoda.digital/trending-now/il-dato-e-mio-e-lo-gestisco-io/
[46] HODA, *https://www.hoda.digital/assets/weople/*

related to the portability and restriction of the use of data for companies, enabling users to go beyond the simple choice of "Cookies" enabled on a given website, but to even decide which data can be used by a specific company and for which reason or goal.

Weople acts as an intermediary between consumers and companies and offers the benefit not only to the people investing their data but also to brands. They can now access hyper-detailed datasets to enhance the personalization of their advertisement, being certain of the precision of the data they are using, with the added value of having their customers know why and how their sensitive information is being utilized, thus enhancing advertisement effectiveness.

So, as data becomes the oil of this century, the first data bank finds its way to the market, striving to give people a way to control their digital assets, as they already do with their financial possessions. Being a quite recent project, statistics and data about Weople's performance are still not available, but seeing how people will react to this kind of applications and possibilities will be interesting for sure.

Citizen.me

"Get real-life value from your life online. For all its perks, being a citizen of the internet demands a lot from your privacy. You're asked to share your information countless times a day, so isn't it time you asked for something in return?"[47]

Just like Weople, CitizenMe mission is to give people more control over their data. In their manifesto they state that if we put individuals in the position to collect and manage their own data, they'll use this "power" to influence brands and spark change, making the web consumer-centered. This philosophical vision is concretized in a "data marketplace", similar to Weople's, where people can essentially profile themselves, obtaining various rewards in return.

Figure 14 - CitizenMe logo.

[47] CitizenMe website, https://www.citizenme.com/public/wp/

The other players involved in the exchange are, of course, brands. The conscious creation of audiences done by customers allows brands to exploit more detailed insights, to market their products to more suitable segments and to minimize budget wasted.

As the platform grows, it could potentially affect and radically influence both sides of the advertisement game: consumers could actually benefit from handing over their personal information, while brands could stop marketing their products to uninterested audiences. As for Weople, the challenge will be to increase service adoption and the trust-building process that will attract people over the platform.

People.io

"It's easy to talk about privacy, it's another to achieve it. We're committed to always thinking 'people first' by putting privacy in its current and future forms at the very heart of people.io"[48]

People.io is another project related to privacy and data control. Similar in the mission but different in the execution, People.io strives to be an application that allows users to create a unified identity over the internet, earning rewards in the meanwhile. The main difference with Weople is the date of their launch: October 2015. In this three years the platform grew rapidly thanks to a brilliant start, but as of today, it is possible to found over the internet numerous articles, videos, and reviews stating that people.io is actually a "scam", suggesting that this kind of business model can be hard to actually scale over a certain size. It will be interesting to follow market developments and watch over Weople and CitizenMe's growth, to see if their business model and their value proposition could actually outvalue people.io's.

Figure 15 - People.io logo.

[48] People.io website, https://people.io/

5. Limitations of the research

In this section we will briefly discuss the main limitations of the research, considering factors that could potentially be modified in future studies to comprehend better the matter at hand.

In order to better comprehend the results of the presented research, it's crucial to also take into account possible limitations that had an impact on the experimental process. First of all, as stated in the discussion section, mouse tracking techniques could have not been the optimal choice to determine the effect of advertisement personalization in the way we intended it in this study design. Even though I think it was a perfect match for advertisement effectiveness, probably an experiment involving eye tracking with more time for trial could result in better measurement, considering also that the mouse tracking experiment involved the use of mock-ups for the advertisements presented, and it could be interesting to reply to the experiment with real digital environments.

Moving on could be interesting to conduct a follow-up survey on subjects, to define their comprehension of the experiment and their perception of personalization. Furthermore, a bigger sample could probably enhance even more experiment accuracy and reliability, allowing to a more secure generability of our results.

Considering the survey, a self-report privacy concern could be biased by the current digital environment, full of alerts and warnings for privacy issues and sensitive information being stolen. But I don’t think there is a better measure for the Degree of privacy concern, at least for this study design.

Finally, considering the huge growth of Facebook Advertising, it is important to take into account that respondents could consider Facebook as a "Hybrid" environment rather than a "Non-Commercial" one, but this also opens up new possibilities for future researches.

IV. CONCLUSIONS

This research introduced a model to broaden privacy-related studies in the advertisement field, with the main novelty being the context in which the advertisement is presented: Commercial (eg. Amazon) or Non-commercial (eg. Facebook).

First of all, we studied and demonstrated the importance of privacy concerns in the advertisement world, leaving to companies the strong suggestion to take into account the degree of privacy concern of their target audience when assessing their digital advertising strategy, especially when using hyper-personalized datasets or custom creativity, tailored on users' preferences.
As demonstrated in previous studies, putting users in control of their sensitive information can improve advertisement effectiveness, that – as we demonstrated in this research and as we were saying – is negatively effected by user's degree of privacy concern.

As we saw, the effect is greater in commercial environments, suggesting that users are more careful about their sensitive information when they are already in the purchase process. Interesting will be to investigare further the effect of advertisement personalization, especially linked with user's privacy concern. Moreover it would be useful for companies to understand better, with a follow-up study, how users actually perceive personalization (with regards of cognitive processes and behaviours) and how the knowledge of how companies handle data can influence advertisement effectiveness.

Furthermore, the concept of giving back control of data to users have been investigated and exploited by different companies like Weople, CitizenMe and people.io, that started projects or developed platforms to achieve this goal. Will this services be more popular than the "right to be forgotten" that American and European citizens can claim? How they will manage to ramp up adoption while remaining profitable will be the key to innovate how advertising works in the era of hyper-targeting.

V. APPRECIATIONS

Grazie alla mia famiglia per il supporto datomi in questi cinque anni.

Grazie a tutte le persone con cui ho avuto l'onore e il piacere di condividere questo percorso. Porterò sempre con me i ricordi di questi anni.

Infine grazie a chi ha deciso di rimanere al mio fianco, anche nei periodi bui. Questo traguardo è anche vostro.

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Appendix

Appendix 1: Privacy survey

Start of Block: Introduction

Intro
Hello!
Thanks for participating in this research,
information gathered from this survey will be used for a study I'm conducting for my Master's Thesis. You will have to answer some simple questions about yourself and the topic of personal information. Please answer sincerely, without overthinking too much.

Intro
Ciao!
Grazie per la tua partecipazione a questa ricerca,
le informazioni raccolte con questo questionario saranno usate per uno studio, condotto per la mia tesi magistrale, sulla personalizzazione degli annunci e sull'importanza della privacy.
Dovrai rispondere ad alcune semplici domande su te stesso e sull'argomento privacy.
Tutte le risposte rimarranno anonime.
Rispondi sinceramente, senza pensarci troppo!

End of Block: Introduction

Start of Block: Demographics

Gender What is your gender?

- Male (1)
- Female (2)

Gender Sei un uomo o una donna?

- Uomo (1)
- Donna (2)

Age What is your age?

<18 (1)

19-25 (2)

26-35 (3)

36-50 (4)

>51 (5)

Age Quanti anni hai?

<18 (1)

19-25 (2)

26-35 (3)

36-50 (4)

>51 (5)

Education What is the highest degree or level of school you have completed? *If currently enrolled, highest degree received.*

Primary school (1)

High school (2)

Bachelor's Degree (3)

Master's Degree (4)

Ph.D. (5)

No schooling (6)

Education Qual è il titolo di studio più alto che hai conseguito? *Se sei attualmente uno studente, rispondi con l'ultimo titolo conseguito.*

Scuola Primaria (1)

Diploma (2)

Laurea Triennale (3)

Laurea Magistrale (4)

Dottorato di Ricerca (5)

Nessuno (6)

End of Block: Demographics

Start of Block: Privacy –

Privacy scale Here are some statements about personal information. From the standpoint of personal privacy, please indicate the extent to which you, as an individual, agree or disagree with each statement by selecting the appropriate option.

	Strongly Disagree (1)	Disagree (2)	Slightly Disagree (3)	Neutral (4)	Slightly Agree (5)	Agree (6)	Strongly Agree (7)
A. It usually bothers me when companies ask me for personal information. (1)							
B. All the personal information in computer databases should be double-checked for accuracy-no matter how much this costs. (2)							
C. Companies should not use personal information for any purpose unless it has been authorized by the individuals who provided the information. (3)							
D. Companies should devote more time and effort to preventing unauthorized access to personal information. (4)							

E. When companies ask me for personal information, I sometimes think twice before providing it. (5)
F. Companies should take more steps to make sure that the personal information in their files is accurate. (6)
G. When people give personal information to a company for some reason, the company should never use the information for any other reason. (7)
H. Companies should have better procedures to correct errors in personal information. (8)

I. Computer databases that contain personal information should be protected from unauthorized access-no matter how much it costs. (9)

J. It bothers me to give personal information to so many companies. (10)

K. Companies should never sell the personal information in their computer databases to other companies. (11)

L. Companies should devote more time and effort to verifying the accuracy of the personal information in their databases. (12)

M. Companies should never share personal information with other companies unless it has been authorized by the individuals who provided the information. (13)

N. Companies should take more steps to make sure that unauthorized people cannot access personal information in their computers (14)

O. I'm concerned that companies are collecting too much personal information about me. (15)

	Fortemente in disaccordo (1)	In disaccordo (2)	Leggermente in disaccordo (3)	Indifferente (4)	Leggermente d'accordo (5)	D'accordo (6)	Fortemente d'accordo (7)
A. Mi dà fastidio quando le aziende chiedono i miei dati personali. (1)							
B. Tutti i dati personali nei database informatici dovrebbero essere ricontrollati per assicurarsi della loro precisione, senza preoccuparsi del costo. (2)							
C. Le aziende non dovrebbero utilizzare dati personali per nessun motivo, a meno che non siano state autorizzate dall'utente. (3)							

D. Le aziende dovrebbero dedicare più tempo e risorse nel prevenire accessi non autorizzati ai dati personali. (4)
E. Quando le aziende chiedono dati personali, mi capita di pensarci due volte prima di fornirle. (5)
F. Le aziende dovrebbero impegnarsi di più per rendere i dati personali nei loro database più accurati. (6)
G. Quando le persone forniscono dati personali a un'azienda, questa non dovrebbe mai usare le informazioni, per nessun motivo. (7)

H. Le aziende dovrebbero avere delle procedure migliori per correggere errori nei dati personali. (8)

I. Database che contengono dati personali dovrebbero essere protetti da accessi non autorizzati - a qualunque costo. (9)

J. Mi dà fastidio dare dati personali a così tante aziende. (10)

K. Le aziende non dovrebbero mai vendere dati personali ad altre aziende. (11)

L. Le aziende dovrebbero dedicare più risorse nel verificare l'accuratezza dei dati personali. (12)

M. Le aziende non dovrebbero mai condividere dati personali con altre aziende, a meno che non siano state autorizzate dall'utente. (13)

N. Le aziende dovrebbero impiegare più risorse per assicurarsi che persone non autorizzate non accedano a dati personali degli utenti. (14)

O. Temo che le aziende stiano raccogliendo troppi miei dati personali. (15)

End of Block: Privacy

Start of Block: Personalization

Display This Question:

If What is your gender? = Female

Female Please select the topics/objects that interest you the most *(Max. 3 choices)*

- ☐ Make-up (1)
- ☐ Cars (2)
- ☐ Shoes (3)
- ☐ Watches (4)
- ☐ Bags/Handbags (5)
- ☐ Bikes/Motorbikes (6)
- ☐ Smartphones (7)
- ☐ Sunglasses (8)

Display This Question:

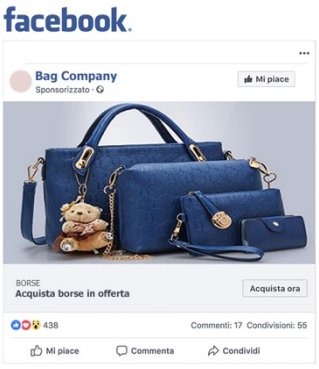
If What is your gender? = Male

Male Please select the topics/products that interest you the most *(Max. 3 choices)*

- ☐ Cars (1)
- ☐ Bikes/Motorbikes (2)
- ☐ Football (3)
- ☐ Smartphones (4)
- ☐ Make-up (5)
- ☐ Watches (6)
- ☐ Shoes (7)

End of Block: Personalization

Appendix 2: Advertisements presented during Mouse Tracking experiments

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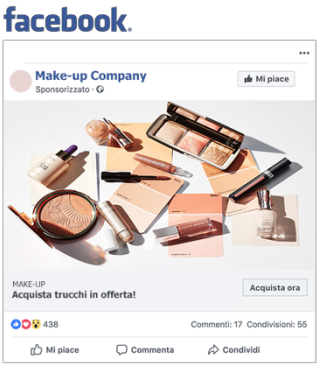
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Short summary

Since the beginning of 2018, privacy and sensitive information have been the trending topics across digital media, appering to also one of the most recurring news theme, but why? Let's cite some of the most important events that followed and actually fed this trend.

On March 18th 2018, Christopher Wylie uncovered the Cambridge Analytica scandal, unveiling the harvest of personal data of millions of Facebook users without their consent. This data was then used to influence last US presidential election, in which Donald Trump resulted the winner.

On April 10th 2018, Zuckerberg was summoned by the US Congress to testimony about the matter. The hearing lasted five hours, and symbolizes an important shift on how privacy and data handling practices are now seen by the general public.

On May 25th 2018, the General Data Protection Regulation was implemented. Also known as GDPR, this regulation is a European law on data protection that addresses the handling of personal data by companies, introducing a unified set of forms and practices with the European Union. Interestingly enough, the regulation introduced a norm, among others, that obliges business to "report any data breaches within 72 hours if they have an adverse effect on user privacy"[49], and fines for the violators "up to €20 million or up to 4% of the annual worldwide turnover of the preceding financial year in case of an enterprise"[50]. It represents a radical change, considering how data breaches were handled before the regulation. But in 2018, privacy had suddenly became a priority not only for individuals, but also for managers and companies. It's a tight equilibrium where on the one hand users prefer and expect personalized services, but on the other they have concern about how their data is handled and use, fearing misuse and data breaches. These concerns have been the main subject of this research, as I investigated and tried to understand their role in affecting advertisement effectiveness. Along with privacy, another important topic is "personalization", considering the rapid growth of hypertargeting practices that occurred during recent times. In fact "as competition increases, businesses face even more pressure to create personally curated experiences that drive consumer engagement and

[49] Intersoft Consulting, "*GDPR*", https://gdpr-info.eu/
[50] *Ibidem.*

differentiation in the market"[51]. Interestingly enough, "83% of consumers are willing to share their data to enable a personalized experience"[52]. For this reason in this thesis I'll explain how I investigated both privacy concern and personalization effects on advertisement effectiveness, taking into account another important factor: the context in which the advertisement is presented. The thesis will be presented as follows: we will define and explain the theory and the methodology behind our research, considering a short literature review of the matters at hand. We will then move on the core of our research: the first step, consisting of the survey I conducted to collect data about privacy concern,and the second step, consisting of a mouse tracking experiment in which I collected data about advertisement effectiveness in different contexts and the effect of personalization. After discussing the results and the implications of my research, I will go through three practical cases, one of which was followed and curated by the digital marketing agency where I'm currently employed. Finally, conclusions of this thesis will be presented. We will address what the near future possibly holds for Advertising as a field, using the results of this research as foundation.

The contribution of this research to the relevant literature regards the main issues covered in the previous section – privacy, advertising context, personalization and data management – with a specific focus on the topics not thoroughly researched like the impact of "Advertisement Personalization" and "Degree of privacy concern" on "Advertisement effectiveness" in different contexts – if the advertisement is presented in a "Commercial" environment or in a "Non-commercial" one – a variable that has found less space compared to the former.
Moreover, of particular interest for the research is the usage of mouse-tracking techniques, which represents a rather young and rising way to analyze individuals' behavior.

[51] Accenture, "*Personalization Pulse Check", https://www.accenture.com/t20180503T034117Z__w__/us-en/_acnmedia/PDF-77/Accenture-Pulse-Survey.pdf*
[52] *Ibidem.*

As time goes by, all major industries are starting to become data-driven. They started understanding the enormous power of decisions supported by data, trends research and statistical analysis, but what does data-driven exactly mean and why are data useful? Data are defined as "information, facts or numbers, collected to be used to help decision-making"[53]. So, companies that are data-driven, or define themselves as such, try to make decisions based on relevant and timely information, potentially allowing them to create a competitive advantage over their competitors.

The results of a study conducted by NewVantage Partners[54] clearly shows how the importance of data and analytics is actually rising at a very rapid pace year after year and how managers are starting to focus on exploiting these opportunities, even though there's still a lot to do. First of all, the main issue is related to the shift from a standard culture to a data-related one. This step is usually very difficult for big and established companies, while recent start-ups are already embodied with it from the start. Huge corporations usually try to embrace the change in appointing new roles, dedicated to the task (chief data office, analysis managers, information managers, etc.). "Virtually all respondents (99%) say their firms are trying to move in that direction, but only about one-third have succeeded at this objective".[55] Handling the transition will be one of the most important and challenging tasks of next years and will be the battleground where future unicorns[56] will put down roots for their long-lasting success.

Having understood that an important transition is now happening in the business world, we can briefly discuss why data are important in a pragmatic way and how companies actually use data, to then move on to web personalization.

According to SAS, data management is important because it "guarantees that data is accurate, aligned with business objectives and used to drive better business decisions."[57] In fact, when data management is on point, data and knowledge can move efficiently between different units or systems, ensuring timely reactions and the correct execution of processes, that can then be standardized and enriched, making data more usable and

[53] Cambridge Dictionary, https://dictionary.cambridge.org/dictionary/english/data
[54] New Vantage Partners, *Big Data Executive Survey*, 2018
[55] Davenport H. T., Bean R., *Big Companies Are Embracing Analytics, But Most Still Don't Have a Data-Driven Culture, Harvard Business Review, 2018*
[56] Definition of Unicorn (finance): https://www.investopedia.com/terms/u/unicorn.asp
[57] SAS, Data Management Insights, 2018, https://www.sas.com/content/dam/SAS/en_us/doc/other1/data-management-why-is-it-important-107421.pdf

exploitable for the whole organization. This cycle can then develop into practices of knowledge and information management, especially important for big corporations where the effective spread of data among employees is crucial on different layers and can guarantee a competitive advantage in the market.

The need to establish correct data collection, management, and analysis processes has led to the rise of data mining practices, consisting of extracting from huge databases knowledge and insights that can be of value to marketers or other professional figures. Data Mining has been defined as "the analysis of (often large) observational data sets to find unsuspected relationships and to summarize the data in novel ways that are both understandable and useful to the data owner".[58]

Following the outbreak of the Internet, the importance of data in the business world has been steadily on the rise since the early '00s, going along with another very important trend: web "personalization". The term itself "is used in the context of receiving from a large body of information only the part that is of interest to an individual or a group of individuals"[59], but it can be narrowed down in one-to-one marketing, with examples like: "displaying certain products or services or information on a web page that may be of potential interest to a particular website visitor as soon as he/she visits the page; identifying potential customers of a new product from all existing customers, and sending them promotion materials or offering promotional deals"[60].

Personalization is not an Internet-exclusive phenomenon. Since the origins of business, every salesman remembers his best customers and tries to serve them in the most satisfying way possible; every owner of a store knows his regular customers and their preferences, exploiting this knowledge to extract more value from them. The last development of this phenomenon is the shift from the offline to the online world, where the number of customers grows exponentially and data becomes the new currency.

"If you are not paying for it, you're not the customer; you're the product being sold"[61].

[58] Hand et al., *Principles of Data Mining*, MIT Press, 2001
[59] Kim W., *Personalization: Definition, Status, and Challenges Ahead*, 2002
[60] *Ibidem*
[61] Lewis A., *Metafilter discussion about User-driven* content, 2010, https://www.metafilter.com/95152/Userdriven-discontent#3256046

This famous quote seems to describe well the value shift happened during the last decades. As we already told, data is becoming the new currency and gathering sensitive information from users seems to be the new "Gold Rush".

Rust et al. (2002) back this up in his research regarding privacy over the Internet, in which he "even argued that the Internet will inevitably cause individual privacy to disappear and that a specialized market for privacy will emerge.[62] In other words, consumers may have to pay for a certain degree of comparative privacy in the future, but the underlying degree of privacy will continue to be eroded."[63]

But how this rolls out in practice? How personalization actually affects advertisement and in equal way advertisers? In this section we will answer this questions, analyzing the different variables that compose our model. We will start by defining "Advertisement personalization".

New media allowed companies to "exploit consumer data to present their users with relevant and personalized advertisement"[64], but the degree of personalization can actually be classified in different stages. Literature that takes into account this variable often lacks a detailed definition of these stages, and for this reason, we will try to be as thorough as possible in defining the different possibilities that marketers have, later assessing which one has been taken into account for this research. For reference, the baseline of this work comprehends information and similar classification as defined by the "Advertising Personalization Classification System"[65].

First stage: Geo-Personalization

The first layer of complexity that marketers usually take into account in designing personalized advertisement is the geographical position of their target audience: regional or seasonal products (winter clothes in cold regions, sunscreen in hot ones) or products linked and advertised accordingly to the specific country/region/city. Either offline or

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[62] Rust, R. T., P. K. Kannan, and N. Peng, *The customer economics of Internet privacy,* Journal of the Academy of Marketing Science, 30, 455–464, 2002

[63] Nam et al., *Consumers' Privacy Concerns and Willingness to Provide Marketing-Related Personal Information Online*, in NA - Advances in Consumer Research Volume 33, eds. Connie Pechmann and Linda Price, Duluth, MN: Association for Consumer Research, Pages: 212-217, 2006

[64] Tucker C., *Social Networks, Personalized Advertising, and Privacy Controls, in Journal of Marketing Research 51, no.5, 546-562*, 2015

[65] Quick T., *Advertising Personalization Classification System*, 2017, https://medium.com/@tysonquick/the-advertising-personalization-classification-system-4ea1dd794d19

online, this first stage of advertisement personalization has different critical weaknesses: for instance, it doesn't intercept an intent, it can't be shown to people interested in that specific product and it produces generic segments of consumers.

Second stage: Demographic personalization

Advertisement personalized with demographic data raise the bar of complexity, allowing marketers to further identify clear demographic clusters, defined by age, gender, relationship status, education, income, and more. This information can later be used to plan a focused promotional campaign around events or holidays (the most common example is Valentine's Day, followed by Halloween). But again, this kind of personalization doesn't really intercept a desire, a strong intent, but rather a demographic "situation" or a sociological phenomenon.

Third stage: Intent/interests personalization

Intentions, interests, and desires are shown through actions and words, both in offline and in the online world. Actions link us with other people, explaining our thoughts and desires. They also reflect our decisions, and thus our wishes. Thanks to the technological development of the last decade, we are now able to identify, capture and analyze these interactions, gaining a huge competitive advantage over competitors and over our own customers. The most common examples here are social media interactions or searches done on a search engine.

Here is where the big rupture happens: the action, the interaction, are a clear representation of what consumers want or in what products they are actually interested in. There's a shift from the marketer perspective to the consumers' one that allows marketing researchers, managers or analysts, to think in a completely different way how to market a product. Leaving aside disruptive products that actually create a new need in consumers' mind, marketing is now becoming a way to satisfy in the most complete way consumers need, intercepting the most possible portion of intent and interest in the target population.

Fourth stage: Hyper-Personalization, Programmatic delivery

As a sum of the previous three stages, a fourth one can be defined. Hyper-Personalization can be defined as the practice to deliver a message that a customer very likely wants to see, on the channel he prefers the most, at the most suitable timing to convince him to purchase our product. This is possible by combining geographical data, intent and behavioral patterns and consumer's history. This is the apex of Retargeting and Remarketing, usually delivered through programmatic platforms which allow marketers to bid in real time for media buying, presenting to customers the most suitable advertisement at the right moment. When marketers can rely on high-quality data sets or information about their customers, programmatic delivery can make a huge impact on company sales: being able to target specific audiences and demographics can reduce "noise" and wasted expenses, as demonstrated by the BCG in their analysis on "programmatic guaranteed", which explained the practices of automating some of the marketer tasks, in favour of efficiency.[66]

In this research we will take into account practices belonging to Stage Three of Ad Personalization, as we will consider answers from a survey that will give us some insights on respondents preferences and intents, that will be later assessed, confirming or not their choices, in a mouse tracking experiment.

The concept of effectiveness relates strongly to what originally is intended as the original goal. Advertisement effectiveness can be defined as "how and in what degree advertising accomplished its purposes". Purposes can be different, spacing from Brand Awareness and Reach to Sales, Conversions, and Profits. Each campaign has different purposes, and as marketers, we should be able to define and analyze the correct metric, specific for each scenario. Advertising context has been previously studied in the literature, and there are different studies of particular interest, especially for the purpose of this research. Kirmani and Yi's provides an interesting point of view on the effect of context on consumer responses. They take into account the definition of "Advertising context" provided by Soldow and Principe in their 1981 research[67]: "Many advertisements do not occur in a vacuum, but rather appear simultaneously with other materials such as programs on TV,

[66] https://www.bcg.com/it-it/publications/2018/guaranteed-opportunity-programmatic-advertising.aspx
[67] Soldow and Principe V., *Response to Commercials as a Function of Program Context,* Journal of Advertising Research, 21 (2), 59-65, 1981

articles in magazines, ads for other products, and station identifications. Such material within which ads are embedded is usually referred to as advertising context".[68] For the sake of this research, we have taken into account two specific types of contexts: "Commercial" (i.e. Amazon) and "Non-Commercial" (i.e. Facebook). We define "Commercial" as a "clear sales environment, with the sole purpose of selling products or to be the container of an advertiser's message; a context that a user can recognize as a marketplace or a shop" and "Non-commercial" as an "environment that can or cannot be related to products sales; a context that does not have as its own core purpose to sell products". In previous literature, effectiveness has been measured in different ways: Artificial Neural Networks[69], Mouse Trajectory[70], Purchase Intention, Clicks, and ultimately, Conversions.

Before defining the Degree of privacy concern, we will briefly review the concept of privacy. Nam et al. (2006) took into account two different points of views to define it: the first one regards the concept at its core, while the second one is more related to the intrusiveness of Internet in people's sensitive information. "Privacy is often understood as the right to be left alone[71]. The invasion of privacy on the Internet is commonly regarded as the unauthorized collection, disclosure, or other use of personal information[72]".[73]

As Buchanan et al. wrote in their research about privacy concern: "concern for privacy is a subjective measure—one that varies from individual to individual based on that person's own perceptions and values. In other words, different people have different levels of concern about their own privacy."[74] In this research we hypothesize an effect of privacy

[68] Kirmani A. and Yi Y, *The Effects of Advertising Context on Consumer Responses*, 1991
[69] Ramalingam, V., Palaniappan, B., Panchanatham, N. and Palanivel, S., *Measuring advertisement effectiveness—a neural network approach*, 2018
[70] Navalpakkam V., Churchill E., *Mouse tracking: measuring and predicting users' experience of web-based content,* 2012
[71] Cheskin Research and Studio Archetype/Sapient, *eCommerce trust study*. Redwood Shores, CA: Cheskin Research, 1999
[72] Wang, H., M. K. O. Lee, and C. Wang, *Consumer privacy concerns about Internet marketing Communications of the Association for Computing Machinery*, 41, 63–70, 1998
[73] Nam et al., *Consumers' Privacy Concerns and Willingness to Provide Marketing-Related Personal Information Online*, in NA - Advances in Consumer Research Volume 33, eds. Connie Pechmann and Linda Price, Duluth, MN: Association for Consumer Research, Pages: 212-217, 2006
[74] Buchanan et al., *Development of Measures of Online Privacy Concern and Protection for Use on the Internet*, 2007

The research objective of this thesis is to investigate and comprehend the impact that the personalization of advertisements and one's degree of privacy concern has on advertisement effectiveness whether it is presented in a commercial environment or in a non-commercial one.

The following research questions have been defined in order to study the matter:

- RQ1: How does the degree of privacy affect advertisement effectiveness?
- RQ2: How does advertisement personalization affect advertisement effectiveness?
- RQ3: How does the advertisement context affect advertisement effectiveness?

The following hypothesis has been formulated in order to answer research questions:

- H1a: Advertisement personalization will have a positive effect on Advertisement effectiveness in a commercial environment, which will be greater than the effect in a non-commercial one.
- H1b: Advertisement personalization will have a positive effect on Advertisement effectiveness in a non-commercial environment, which will be smaller than the effect in a commercial one.

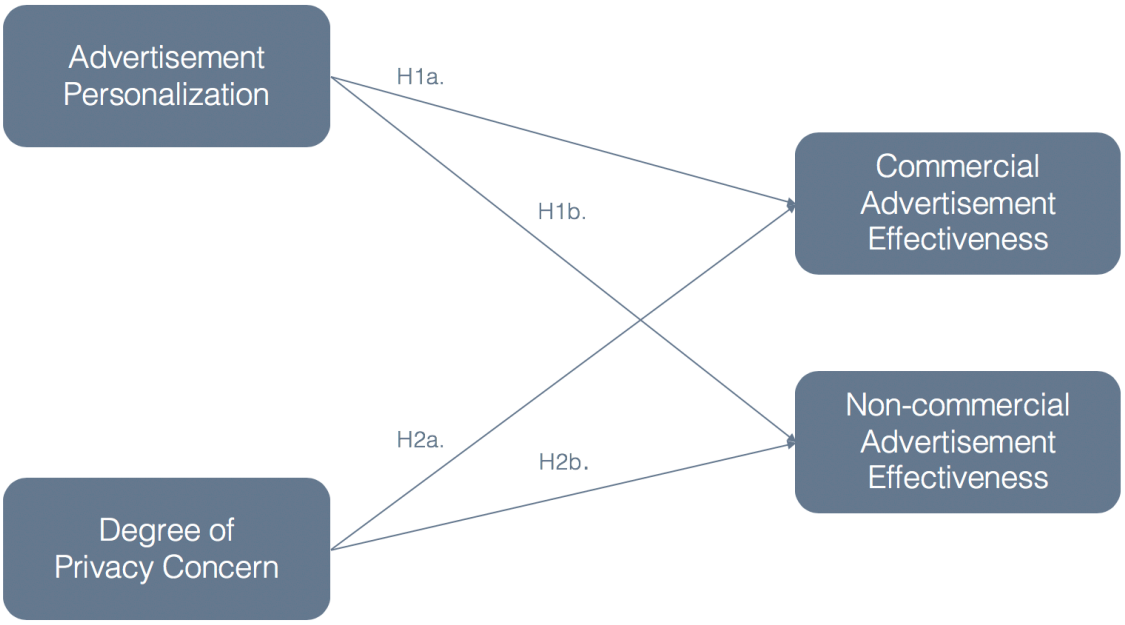
We expect that the personalization positive effect will be greater in commercial environments because it intercepts a strong purchase intent and will with more probability be embraced by the potential customer.

- H2a: Degree of privacy concern will have a negative effect on advertisement effectiveness in a commercial environment, which will be greater than the effect in a non-commercial one.
- H2b: Degree of privacy concern will have a negative effect on advertisement effectiveness in a non-commercial environment, which will be smaller than the effect in a commercial one.

We expect that the privacy concern negative effect will be greater in commercial environments rather than in non-commercial ones, considering that people are often more aware of giving up their personal information in social environments like Facebook.

This research has been developed around a four-variables model. "Commercial Advertisement effectiveness" and "Non-commercial Advertisement effectiveness" are the dependent variable, while "Advertisement Personalization" and "Degree of privacy concern" are independent variables.

The research is designed to assess the relationship the variables and explain the impact of "Advertisement Personalization" and of the "Degree of Privacy Concern" on



"Advertisement Effectiveness", taking into account this effectiveness in two different contexts. In fact, the "Commercial" and "Non-Commercial" adjunct in the dependent variables do not refer to the advertisement itself but explains the environment in which it is presented.

The analysis conducted showed us that "Degree of Privacy Concern" has a significant and negative effect on Advertisement Effectiveness, both in Commercial and Non-Commercial environments. These results are in line with what we hypothesized in previous sections, in particular with H2a and H2b. In fact, privacy concerns have a greater effect in commercial environments, confirming our assumption that people are often more lenient on giving away their personal information in social environments like Facebook.

Previous literature findings defined the importance of privacy and how it can influence advertisement effectiveness, but this research findings enhance the scope of this influence, taking into account the Commercial and Non-commercial nature of the environment in which advertisements are presented. The significance of both models is an important suggestion for companies and advertisers. Remembering that companies using customers data are seeing their "productivity and profit [...] 5 to 6 percent higher than those of the competition"[75], it's important to lay out a model to enhance the usability and profitability of data, while taking into account the customer's privacy and concern about their sensitive information. Considering previous studies on the matter, this is in line with Xu et al. research about privacy concerns, assessing that it affects negatively consumer behavior[76] and with Sheng et al. findings of privacy as an antecedent belief that can have an impact on consumer's attitude and moreover their intention[77].

Regarding H1a and H1b about advertisement personalization, the models and the predictors that took into account Maximum Deviation as "Advertisement Personalization" measure were not significant. The variable value has been measured by mouse tracking, a technique that helps to measure subjects' underlying cognitive processes. A possible explanation for this non-significance can be hypothesized by taking into account the fact that subjects feel and account personalization in a more rational way, rather than spontaneous. Having to start answering in milliseconds can help show and track underlying cognitive processes, but, for how the advertisements were designed and how they were presented, it probably wasn't enough to account for personalization. Even though the effect was not significant, we still think that "Advertisement Personalization" has a big impact on "Advertisement Effectiveness" and suggest follow-up researches with different techniques, in order to better investigate the relationship between this two variables; one possible method being Eye Tracking.

Considering these research findings, companies should try to be more upfront with their users in regards to how they handle privacy matters and how they manage sensitive information. Even though with the introduction of the GDPR some practices related to

[75] Biesdorf et al., *"Big Data: What's Your Plan?"* McKinsey Quarterly (March), 2013
[76] Xu et al*., "Predicting the adoption of location-based services: the role of trust and perceived privacy risk"*, 2005
[77] Sheng et al., *"An Experimental study on ubiquitous commerce adoption: impact of personalization and privacy concerns"*, Journal of the Association for Information Systems, 2008

this matter became mandatory, not all the firms comprehend the importance of handling correctly privacy-related issues.
Companies should try to give more control over their sensitive data to users, because, as demonstrated in previous studies, "personalized advertising [...] was nearly twice as effective at attracting users [...] after the shift in Facebook policy that gave users more control over their personal information"[78]. Moreover, usage of data for personalizing advertisement should be clear and upfront, in fact, there is "no significant change in advertising that was shown to the same people but used a generic message [...], such ads do not make clear to consumers whether their private information is used to target".[79]

Regarding personalized advertisements used in our experiment, it's important to stress out that the "personalized" ads were designed starting from survey's answer, and the personalization level could have been too low to effectively impact the results of our research. This is supported by White's research about reactance to personalized content. He states that "reactance to personalized advertising is greater when the information used is more unique".[80] For further research it's advisable to take into account a more detailed and deep technique to collect information to be used in the personalization process, to really stand out during the experimental part of the study.

This research introduced a model to broaden privacy-related studies in the advertisement field, with the main novelty being the context in which the advertisement is presented: Commercial (eg. Amazon) or Non-commercial (eg. Facebook).
First of all, we studied and demonstrated the importance of privacy concerns in the advertisement world, leaving to companies the strong suggestion to take into account the degree of privacy concern of their target audience when assessing their digital advertising strategy, especially when using hyper-personalized datasets or custom creativity, tailored on users' preferences.

[78] Tucker C., *Social Networks, Personalized Advertising and Privacy Controls, in:Journal of Marketing Research 51, no.5, 546-562*, 2015
[79] *Ibidem.*
[80] White et al., *"Getting too personal: reactance to highly personalized email solicitations. Marketing Letters",* 2008

As demonstrated in previous studies, putting users in control of their sensitive information can improve advertisement effectiveness, that – as we demonstrated in this research and as we were saying – is negatively effected by user's degree of privacy concern.

As we saw, the effect is greater in commercial environments, suggesting that users are more careful about their sensitive information when they are already in the purchase process. Interesting will be to investigare further the effect of advertisement personalization, especially linked with user's privacy concern. Moreover it would be useful for companies to understand better, with a follow-up study, how users actually perceive personalization (with regards of cognitive processes and behaviours) and how the knowledge of how companies handle data can influence advertisement effectiveness.

Furthermore, the concept of giving back control of data to users have been investigated and exploited by different companies like Weople, CitizenMe and people.io, that started projects or developed platforms to achieve this goal. Will this services be more popular than the "right to be forgotten" that American and European citizens can claim? How they will manage to ramp up adoption while remaining profitable will be the key to innovate how advertising works in the era of hyper-targeting.