THE IMPACT OF THE GDPR ON THE ONLINE ADVERTISING MARKET

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Abstract

In an effort to protect users' privacy, regulators all over the world are introducing new laws that impose restrictions on firms' capacity to collect and process personal data. These restrictions substantially affect the online advertising industry, in which publishers and advertisers rely on user data to personalize ads and content and to generate revenue. To comply with the new privacy-related obligations they face, firms have had to change their operations profoundly, incurring substantial costs related to the development of technical and legal infrastructure, as well as day-to-day processing costs associated with compliance—while at the same time losing revenue as a result of limitations on access to user data. Researchers, practitioners, and policymakers have yet to obtain a comprehensive and precise understanding of these costs, even though such an understanding is crucial for evaluating the economic effects of privacy laws and for shaping future regulations. This book aims to provide such an understanding, focusing on the European General Data Protection Regulation (GDPR) as the first of a handful of strict privacy laws initiated in Europe and worldwide.

Specifically, this book begins by (i) outlining how the online advertising industry operates, and providing a breakdown of how the different actors in this industry—primarily publishers and advertisers—leverage users' personal data to pursue their respective goals. Next, it (ii) provides an overview of the contents of the GDPR, highlighting the aspects that are most meaningful to the advertising industry. In particular, it discusses the need for firms to supply a legal basis for data processing, which, in practice, entails obtaining users' permission to process their data for specified purposes. This book further (iii) provides step-by-step descriptions of the complex process of obtaining user permission for data processing, elaborating on the costs involved, and on the tools that have been developed to assist firms in this process. One such tool is the Transparency and Consent Framework (TCF), a framework designed by Europe's Internet Advertising Bureau to standardize the procedures through which firms formulate permission requests and transfer user data to other firms in a manner compliant with the GDPR.

The manuscript also (iv) provides empirical insights into the complexity of the process of obtaining permission for personal data processing, for industry actors as well as for the users who respond to these requests. Notably, our estimates suggest that if, in line with the GDPR's vision to put users in control of their data, users were indeed to make all possible decisions regarding the processing of their personal information, the average user would need to devote, on average, 78 minutes per day to making data processing–related decisions.

Table of Contents

Abstract v
List of Abbreviations xii
List of Figures xiii
List of Tables xv

1. Introduction 1

2. Overview of the Online Advertising Industry 5

2.1 Essential Actors: Advertisers, Publishers and Users 5
2.2 Scope and Types of Online Advertising 7
2.3 Real-Time Bidding as a Process of Selling Online Advertising 8
2.4 Description of Other Actors 10
2.5 Main Takeaways 12

3. User Tracking, Profiling, and Targeting in Online Advertising 15

3.1 Description of User Tracking Technologies 15
3.1.1 Single-Device User Tracking 16
3.1.1.1 Cookies 16
3.1.1.2 Digital Fingerprinting 19
3.1.1.3 Advertising Identifiers 19
3.1.1.4 Local Storage 20
3.1.1.5 Tracking Pixel 20
3.1.2 Cross-Device User Tracking 20
3.1.2.1 Cross-Device User Tracking on a First-Party Website 21
3.1.2.2 Cross-Device User Tracking on a Third-Party Website 21
3.1.3 Comparison of User Tracking Technologies 21
3.2 Importance of Tracking, Profiling, and Targeting for the Online Advertising Industry 24

3.2.1 Importance for Advertisers . . . 25
3.2.2 Importance for Publishers . . . 27
3.3 Implications for Users . . . 28
3.3.1 Personalization of Content . . . 28
3.3.2 Personalization of Ads . . . 29
3.3.3 Privacy . . . 29
3.4 Main Takeaways . . . 30

4. Personal Data Processing under the GDPR . . . 31
4.1 Aim and Scope of the GDPR . . . 31
4.2 Definition of Personal Data . . . 32
4.3 User Rights with Regard to Personal Data Processing . . . 33
4.3.1 Rights Enabling Users to Understand the Processing of Their Personal Data . . . 33
4.3.2 Rights Enabling Users to Change the Processing of Their Personal Data . . . 34
4.3.3 Rights Enabling Users to Restrict the Processing of Their Personal Data . . . 35
4.4 Obligations for Firms that Process Personal Data . . . 36
4.4.1 The Role of the Firm: Data Controller or Data Processor . . . 36
4.4.1.1 Definition of Data Controller . . . 36
4.4.1.2 Definition of Data Processor . . . 36
4.4.1.3 Relationship Between Data Controller and Data Processor . . . 36
4.4.2 Shared Obligations for Both the Data Controller and Data Processor . . . 37
4.4.3 Obligations for Data Controller but not Data Processor . . . 39
4.4.4 Obligations with Respect to Legal Bases . . . 39
4.4.4.1 Legal Bases not Relevant for Advertising . . . 40
4.4.4.1.1 Vital Interest . . . 40
4.4.4.1.2 Public Interest . . . 40
4.4.4.1.3 Legal Obligation . . . 40
4.4.4.1.4 Contract Fulfillment . . . 41
4.4.4.2 Legal Bases Relevant for Advertising . . . 41
4.4.4.2.1 Legitimate Interest . . . 41
4.4.4.2.2 Consent . . . 42
4.5 Specific Conditions Regarding Legal Bases for User Tracking Technologies . . . 43
4.6 Legal Bases for Tracking under other Privacy Laws . . . 44
4.7 Main Takeaways . . . 46

5. Effects of the Requirement for a Legal Basis for Data Processing 47

5.1 Effects Independent of the Outcome of the User's Decision 48

5.1.1 Effects of Asking for Permission 48

5.1.1.1 Effects on Firms Operating in the Online Advertising Industry 48

5.1.1.2 Effects on the User 49

5.1.2 Effects of Documenting and Managing Permissions. 50

5.1.2.1 Effects on Firms Operating in the Online Advertising Industry 50

5.1.2.2 Effects on the User 52

5.2 Effects Dependent on the Outcome of the User's Decision 53

5.2.1 Effects of Granting Permission 53

5.2.1.1 Effects on Firms Operating in the Online Advertising Industry 53

5.2.1.2 Effects on the User 53

5.2.2 Effects of Denying Permission 54

5.2.2.1 Effects on Firms Operating in the Online Advertising Industry 54

5.2.2.2 Effects on the User 55

5.3 Main Takeaways 57

6. Consent Management Tools 59

6.1 Consent Management Platforms (CMPs) for the Online Advertising Industry 59

6.1.1 Use of Consent Management Platform (CMP) for Requesting User Permission for Data Processing. 60

6.1.2 Use of Consent Management Platform (CMP) for Managing Permission 61

6.2 Software for the User 63

6.2.1 Use of Browser Extensions for Making Decisions on Permission 64

6.2.2 Use of Browser Extensions for Managing Permissions 66

6.3 Main Takeaways 66

7. Getting User Permission for Personal Data Processing via the Transparency and Consent Framework (TCF) 67

7.1 Challenges of Getting Permission. 67

7.1.1 Challenges of Specifying Purposes for Permission 69

7.1.2 Challenges of Handling Permission. 70

7.1.3 Challenges of Checking Permission for Data Transfer 71

7.2 Transparency and Consent Framework (TCF) 72

7.3 Mitigating Challenges in Specifying Purposes for Permission 73

7.3.1 Facilitating Accuracy of Communication 73

7.3.1.1 Purposes . . . 73
7.3.1.2 Special Purposes . . . 75
7.3.2 Facilitating Explicitness of Communication . . . 76
7.3.2.1 Features . . . 76
7.3.2.2 Special Features . . . 76
7.3.3 Facilitating Convenience of Communication with Stacks . . . 79
7.4 Mitigating Challenges in Handling Permission . . . 80
7.4.1 Facilitating Asking for Permission . . . 80
7.4.1.1 Global Vendor List (GVL) . . . 80
7.4.1.2 Consent Management Platforms (CMPs) Registered with the TCF . . . 81
7.4.2 Facilitating Storing Permission with Transparency and Consent String (TC String) . . . 82
7.4.3 Integrating Asking for Permission and Storing Permission . . . 83
7.4.3.1 Case 1: A Publisher Obtains Consent on its own Behalf . . . 84
7.4.3.2 Case 2: A Publisher Obtains Consent on Behalf of a Vendor . . . 85
7.4.3.3 Case 3: A Publisher Obtains Consent on Behalf of Multiple Vendors . . . 87
7.4.3.4 Example Procedures: Concluding Remarks . . . 89
7.5 Mitigating Challenges in Checking Permission for Data Transfer . . . 90
7.5.1 Facilitating Checking Permission for Publishers . . . 90
7.5.2 Facilitating Checking Permission for Data Transfer Between Vendors . . . 93
7.6 Main Takeaways . . . 94

8. Empirical Examination of the Complexity of Getting Permission for Data Processing . . . 95

8.1 Aim of the Empirical Study . . . 95
8.2 Data Collection and Description . . . 96
8.3 Examining the Complexity of Getting Permission for Actors in the Online Advertising Industry . . . 98
8.3.1 Measurement of Complexity: Interconnectedness . . . 98
8.3.2 Description of Results . . . 99
8.4 Examining the Complexity that Users Face in Making Decisions about Permission . 100
8.4.1 Measurement of Complexity: Decision Costs . . . 100
8.4.2 Description of Results . . . 104
8.4.2.1 Number of User Decisions . . . 104
8.4.2.2 Time Spent on Making Decisions . . . 105
8.5 Main Takeaways . . . 110

9. Outlook on Further Developments 111
9.1 Activities that Aim to Decrease the Processing of Personal Data 111
9.2 Activities that Aim to Increase the Processing of Personal Data 113
9.3 Outlook on Further Regulatory Activities 114
9.3.1 Digital Services Act 115
9.3.2 Digital Markets Act 115
9.3.3 ePrivacy Regulation 116
9.3.4 Tracking-Free Ads Coalition 117
9.3.5 Deviations of the GDPR's Interpretation and Enforcement 118
9.4 Outlook on Further Activities of Consumer Protection Agencies 119
9.4.1 None of Your Business (NOYB) 119
9.4.2 Irish Council for Civil Liberties 120

10. Summary and Conclusions 121
10.1 Summary 121
10.2 Conclusions 123

11. References 125

12. Glossary 131

13. Information about the Authors 139
13.1 Bernd Skiera 139
13.2 Klaus Miller 139
13.3 Yuxi Jin 139
13.4 Lennart Kraft 140
13.5 René Laub 140
13.6 Julia Schmitt 140

List of Abbreviations

API:	Application Programming Interface
CCPA:	California Consumer Privacy Act
CMP:	Consent Management Platform
CNIL:	Commission Nationale de l'Informatique et des Libertés, i.e., the French Data Protection Agency
CR:	Conversion Rate
CTR:	Click-through Rate
DMA:	Digital Markets Act
DPA:	Data Protection Authority
DSA:	Digital Services Act
DSP:	Demand-side platform
GDPR:	General Data Protection Regulation
GVL:	Global Vendor List (in TCF)
IAB:	Interactive Advertising Bureau
LGPD:	Brazil's privacy law, Lei Geral de Proteção de Dados
LIA:	Legitimate Interests Assessment
NOYB:	None of Your Business
NPO:	Nederlandse Publieke Omroep, which is Netherland's public broadcaster
PDPA:	Thailand's privacy law, Personal Data Protection Act
PDPB:	India's privacy law, Personal Data Protection Bill
PIMS:	Personal Information Management Services
PIPL:	China's privacy law, Personal Information Protection Law
PV:	Publisher-vendor
RTB:	Real-time bidding
SSP:	Supply-side platform
TC string:	Transparency and Consent String (in TCF)
TCF:	Transparency and Consent Framework
UI:	User Interface
WTP	Willingness to pay

List of Figures

Figure 1: Interplay among the Essential Actors of the Online Advertising Market. 6

Figure 2: Size and Share of Different Formats of Online Advertising in the US (IAB 2021) 7

Figure 3: Digital Advertising Spend per Capita in 15 countries (IAB 2020) 8

Figure 4: Illustration of the Auction Process in Real-Time Bidding (RTB) 9

Figure 5: Overview of Actors in the Online Advertising Industry (DisplayLUMAscape) 10

Figure 6: Delivery of Content and Ads from the User's Perspective when Visiting a Website 12

Figure 7: Categorization of User Tracking Technologies 16

Figure 8: Relationship between Tracking, Profiling and Targeting for Online Advertising 24

Figure 9: Forms of Targeting in Online Advertising 25

Figure 10: Example of a Cookie Banner (here: www.ecodibergamo.it) 48

Figure 11: Example of a Data Request (here: Member Area of Zalando.de). 52

Figure 12: Example of the PUR Model (here: www.washingtonpost.com). 56

Figure 13: Managing Cookie Settings at Bloomberg.com 62

Figure 14: Example of a History of a User's Decisions on Permission for Personal Data Processing. 63

Figure 15: Legal Bases for (Special) Purposes and (Special) Features in the Transparency and Consent Framework (TCF) 2.0 78

Figure 16: Process of Getting Consent under the Transparency and Consent Framework (TCF) for Case 1. 84

Figure 17: Process of Asking for and Storing Consent under the Transparency and Consent Framework (TCF) for Case 2 86

Figure 18: Process of Getting Consent under the Transparency and Consent Framework (TCF) for Case 3. 88

Figure 19: Outcomes of Actions from a Publisher, a Vendor, and a User When a Publisher Transfers Data to a Vendor 92

Figure 20: Outcomes of States of Two Vendors When a Vendor Transfers Data to another Vendor. 93

Figure 21: User Interface of the TCF CMP Validator 97

Figure 22: Development of Number of Vendors Participating in the TCF 2.0 98

Figure 23: Histogram of Number of Vendors on the GVL for each Publisher in the TCF 99

Figure 24: Example of a Publisher Using Stacks to Get User's Permission (here: theguardian.com) 103

Figure 25: Histogram of Number of User Decisions on Cookie Banner for each Publisher in Scenario Case Heavy 104

Figure 26: Histogram of Number of User Decisions on Cookie Banner for each Publisher in Scenario Case Medium 105

List of Tables

Table 1: Comparison of Most Important User Tracking Technologies 23

Table 2: Applicability of the GDPR for EU and non-EU Firms Processing Personal Data of EU and non-EU Citizens 32

Table 3: Overview of User Rights and Their Aims under the GDPR 33

Table 4: Overview of Obligations for both Data Controller and Data Processor under the GDPR. 37

Table 5: Overview of Obligations only for Data Controller and not for Data Processor . . . 39

Table 6: Comparison of Legal Bases for Tracking in Major Privacy Laws Worldwide 45

Table 7: Core Functionalities of a Consent Management Platform (CMP) 60

Table 8: Steps, Actions, and Challenges in Getting User Permission for Personal Data Processing towards Supplying a Legal Basis under the GDPR . . . 68

Table 9: Specification of Purposes in the Transparency and Consent Framework (TCF) 2.0 74

Table 10: Specification of Special Purposes in the Transparency and Consent Framework (TCF) 2.0 75

Table 11: Specification of Features in the Transparency and Consent Framework (TCF) 2.0 76

Table 12: Specification of Special Features in the Transparency and Consent Framework (TCF) 2.0 77

Table 13: Example of a Stack in the Transparency and Consent Framework (TCF) 2.0. . . 79

Table 14: Overview of Cases of Asking for and Storing Consent under the Transparency and Consent Framework (TCF) 83

Table 15: Legal Bases for Purposes under TCF Specification of an Example Vendor (here: Emerse Sverige AB) 91

Table 16: Example of User Decisions in Case Heavy, Case Medium, and Case Light. . . . 101

Table 17: Example for Calculating Number of User Decisions on Cookie Banner Settings for Scenarios Case Heavy, Case Medium, and Case Light . . . 102

Table 18: Calculation of Content Reading Time and the Number of Daily Visited Websites . 106

Table 19: Summary of Assumptions for Decision Time Calculation. 107

Table 20: Calculation of User Decision Time on Cookie Banner in Scenario Case Light . . 108

Table 21: Summary of User Decision Cost Estimation under Different Scenarios 109

1

Introduction

Tracking technologies such as cookies and digital fingerprinting enable firms to collect and exchange extensive data about consumers ("users"). These data are often used to improve the performance of online advertising, which publishers—here defined as websites or apps that provide space to display ads—rely on to finance the "free" content to which their users have become accustomed. Until recently, such data collection was massive in scope, and often occurred without users' permission, which led to a loss of user privacy. In response, policymakers in Europe and elsewhere have put forward initiatives to protect user privacy. One of the most prominent regulations is Europe's General Data Protection Regulation (GDPR), which went into effect in 2018; this regulation is at the focus of the current book. The GDPR will be complemented by the ePrivacy Regulation (ePR). Outside Europe, large-scale initiatives to protect user privacy include the California Consumer Privacy Act (CCPA), India's Personal Data Protection Law (PDPB), Thailand's Personal Data Protection Act (PDPA), Brazil's Lei Geral de Proteção de Dados Pessoais (LGPD) and China's Personal Information Protection Law (PIPL). These laws prevent firms from processing personal data, where the term "processing" encompasses a wide range of operations, including collecting, combining and storing personal data.

The main purpose of these laws is to protect users' "privacy". In fact, comprehensive reviews of privacy literature emphasize that there is no widely agreed-upon definition of privacy (Bleier, Goldfarb, and Tucker (2020), Martin and Murphy (2017), Norberg, Horne, and Horne (2007) and Wieringa et al. 2021). Westin (1967) defined privacy as "the ability of the individual to control the terms under which personal information is acquired and used." The GDPR effectively relies on this conceptualization of privacy, as its main provisions focus on users' control over their personal data. Herein, we adopt a similar perspective of the construct of privacy—with some extensions. For example, in line with a common approach in the popular media, we assume that a more extensive collection of data from consumers implies less privacy.

In restricting the processing of personal data, privacy laws affect online advertising and, thus, the different actors operating in the online advertising market. Though several studies have begun to explore these effects (e.g., Peukert et al. 2022; Schmitt, Miller, and Skiera 2022), researchers and policymakers have yet to obtain a comprehensive and precise understanding of the implications of privacy laws for the online advertising market. This lack of clarity is unfortunate because as regulations continue to be formulated or updated, it is crucial for regulators and societies at large to understand the trade-off between user privacy and the economic value that the online advertising industry derives from processing personal data through potentially privacy-infringing technologies. Likewise, firms in the online advertising industry need to understand the implications of stricter privacy requirements for their performance, so as to adjust to these requirements effectively. Finally, users also deserve to understand what happens with their data, and the consequences of such data usage, or restrictions thereof.

One important reason for the lack of clarity on the implications of privacy laws for advertising is that the online advertising market is difficult to understand. It is a high-tech industry that comprises several extensive networks with many actors, as we will illustrate in these pages (see, in particular, our illustration of the complexity of the industry in Section 2 and our empirical study in Section 8). From a technological perspective, these actors accomplish extraordinary feats, such as conducting billions of auctions with many participants each day to sell single ad impressions in less than 100 milliseconds, or displaying personalized ads to millions of users.

Because of the complex technologies used in online advertising, effective decision-making in this market requires combining a technological perspective (e.g., finding the best technology to track users) with a marketing perspective (e.g., finding the best users to target). With the launch of far-reaching privacy laws such as the GDPR, it is becoming increasingly important for actors in this industry to consider the legal perspective as well. The need to combine these three perspectives implies that professionals in the advertising field must possess some level of expertise in multiple domains. For example, lawyers in the advertising industry need to understand what "cookies" and "consent strings" are, and marketing managers and IT experts need to understand the meanings of legal terms such as "legitimate interest" or "identifiable individual".

Our vision for this book is, thus, to provide an accessible yet comprehensive synthesis of what is currently known about how privacy laws—particularly the GDPR—affect the online advertising market. To this end, we highlight the requirements stipulated in the GDPR that are most relevant to the advertising industry, and we further clarify the implications of these requirements for the key actors in this industry, as well as for users. In doing so, we aim to provide actors in this market (in particular advertisers, publishers and users), as well as regulators and society at large, with better tools to (i) assess the trade-off between the benefits and the costs of more privacy, (ii) understand problems

in implementing the requirements of GDPR, and (iii) draw conclusions on how to deal with the stricter privacy requirements that come with privacy laws such as the GDPR.

The remainder of this book is organized as follows. Section 2 outlines how the online advertising industry operates. Section 3 provides a basic overview of tracking technologies, the ways in which publishers, advertisers, and other firms use them, and the implications of tracking for users. Section 4 elaborates on the contents of the GDPR, focusing on the obligations relevant to firms in the advertising industry. In Section 5, we discuss the GDPR requirement that affects the advertising industry most profoundly: the need to secure a legal basis for data processing, which, in practice, entails obtaining user permission for data processing for specific purposes—e.g., via consent management tools, discussed in Section 6. Section 7 provides a step-by-step description of the procedure that firms must undertake to obtain user permission for data processing, and it presents a framework developed by IAB Europe, Europe's industry association for digital marketing and advertising, to assist firms in accomplishing this process (the Transparency and Consent Framework; TCF). Section 8 provides an empirical assessment of the complexity that firms face in obtaining permission, as well as the complexity that users face in handling permission requests. Section 9 provides an outlook on future developments in the advertising industry and in the regulatory landscape with regard to the processing of users' personal data. Finally, Section 10 provides conclusions.

2

Overview of the Online Advertising Industry

2.1 Essential Actors: Advertisers, Publishers and Users

Online advertising is, in basic terms, a process in which an advertiser pays a publisher to present an ad to a user on the publisher's property (usually a website or an app). Thus, there are three essential actors in online advertising (in alphabetical order):

- the *advertiser*, who wishes to draw the user's interest to the advertiser's offerings;
- the *publisher*, who has some space to show ads and would like to "monetize the user" by selling those ad spaces to the advertiser;
- the *user*, who is primarily interested in the publisher's offering (e.g., the content of a news website) and is sometimes also interested in the ads displayed on the site.

Figure 1 outlines the business models of advertisers and publishers; the exchanges that occur among advertisers, publishers and users; and the (often implicit) agreements among them.

Figure 1: *Interplay among the Essential Actors of the Online Advertising Market*

Many publishers offer users "free" access to their content—e.g., news—in exchange for the ability to collect data from these users, as well as to provide other actors, such as advertisers, with opportunities to contact the users. Thus, even when users ostensibly receive content without paying for it, they are still paying—not with money but with their data and willingness to view ads. Advertisers pay publishers for the opportunity to contact users and, to a lesser extent, pay for data about those users. Advertisers then proceed to display ads to users and, in cases in which relevant data are available, they may target certain users and even personalize ads to their preferences. Users, in turn, are expected to see those ads and, at least in some cases, to "purchase" the advertiser's offerings—where a purchase is broadly defined as a desired action that benefits the advertiser (including, for example, buying products, subscribing to an online newsletter, signing up for a test drive of a car, downloading a document, or donating).

At the heart of this interplay between the various actors is the tracking of users, which provides advertisers with two key capabilities. The first is the capacity to process data about users for profiling, which enables advertisers to better target ads to appropriate users, and thus to avoid wastage of ads. For example, an advertiser likely prefers to avoid sending a male user an ad for female hygiene products (and the other way around). The second is the capacity to recognize, at least to some extent, whether the ads are

successful—which, in turn, enables the advertiser to determine whether it is worthwhile to continue spending money on a given publisher (and, ultimately, on the publisher's users). For example, if an ad served on a particular publisher does not receive any user reaction (as measured, e.g., by clicks on the ad), the advertiser might then conclude that, for the specific advertisement, the publisher does not attract the right audience, i.e., the right type of user. Alongside these benefits, however, user tracking raises privacy concerns, as elaborated in subsequent sections.

2.2 Scope and Types of Online Advertising

The online advertising industry is large and represents an essential part of the economy. Internet advertising revenues have grown consistently over recent years; in 2020, for example, the growth rate in the US was an impressive 12.2%, with revenues reaching $139.8b (IAB 2021). Advertisers spent 70% of all online advertising funds on advertising on mobile devices (including smartphones and tablets) and 30% on desktop platforms. Regarding ad format, the largest share of funds (42.2%, see Figure 2) is spent on search engine ads, i.e., ads delivered via search engines, notably Google. Display advertising (i.e., banner advertising) represents the second-largest share (31.5%), and video advertising, e.g., on YouTube, the third-largest share (18.7%). Other forms of online advertising (e.g., classified advertising, audio formats, lead generation ads) play a minor role.

The ad-selling market is highly concentrated; indeed, in 2020, the top 10 publishers realized 78.1% of all advertising revenues (IAB 2021). Google and Facebook are by far the two largest publishers in the Western world. The ad-buying marketing is far less concentrated, i.e., there are no advertisers that dominate the demand side in a manner comparable to Google and Facebook on the supply side.

Figure 2: *Size and Share of Different Formats of Online Advertising in the US (IAB 2021)*

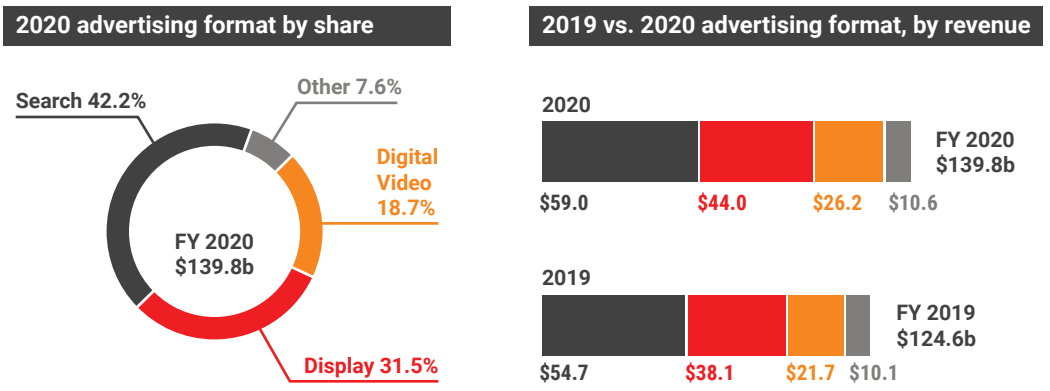
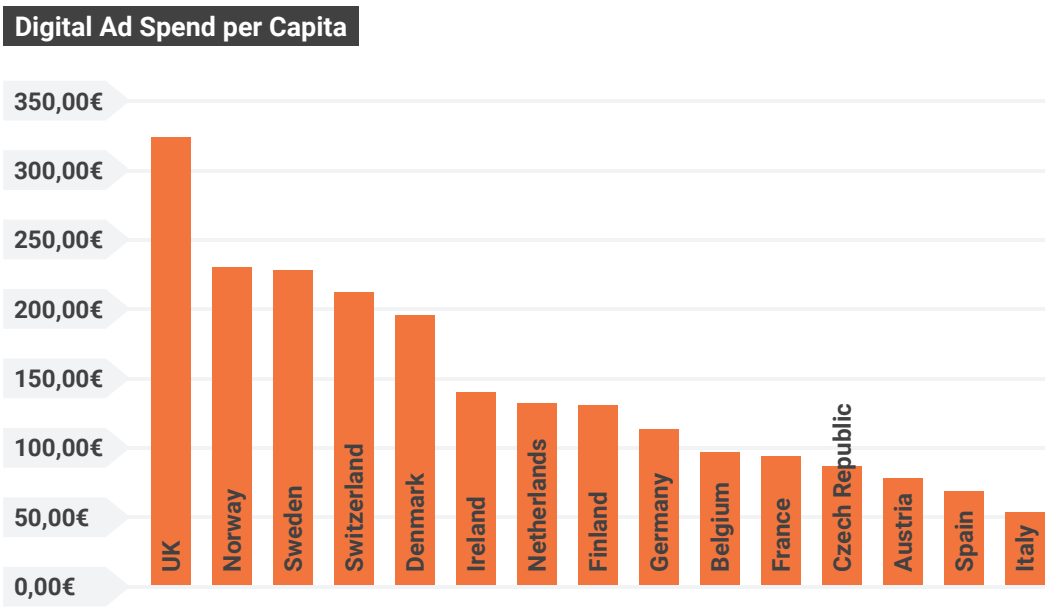


Figure 3 outlines the digital advertising spend per capita for selected European countries (IAB 2020). Advertising expenditures per internet user are, by far, highest in the UK (324.70€), followed by Norway (231.30€), Sweden (229.40€), Switzerland (212.40€) and Denmark (194.80€). In Germany, the average amount spent per Internet user is 113.40€.

Figure 3: *Digital Advertising Spend per Capita in 15 Countries (IAB 2020)*



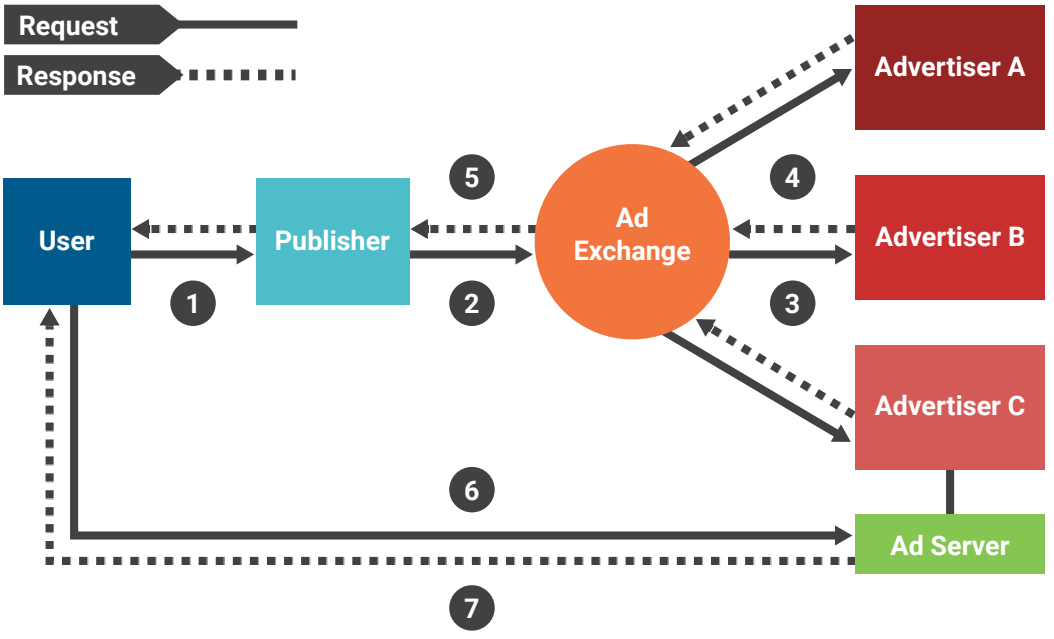
2.3 Real-Time Bidding as a Process of Selling Online Advertising

In this subsection, we describe a prominent process of selling online advertising, which we refer to as "real-time bidding" (RTB), and which is also referred to in the industry as "programmatic advertising", because advertisers and publishers use algorithms to buy and sell advertising (Kosorin 2016). The 2021 IAB report (IAB 2021) outlines that 88% of ads (excluding search) sell as programmatic advertising. This process constitutes a key source of concern for regulators and privacy advocates. For clarity of presentation, in what follows, our discussion focuses primarily on online display advertising (also referred to as banner advertising) but selling digital video ads shares many characteristics. Online display advertising is well known to most users and raises many privacy concerns because it often involves exchanging data between firms. It uses an auction-based system to sell ads, as search ads also do. Other forms of advertising, including traditional offline advertising such as TV and outdoor, gradually implement comparable systems.

Real-time bidding is a collective term for the technological infrastructure used to sell opportunities to display an ad in real-time and in a fully automated manner (Yuan, Wang, and Zhao 2013, Wang, Zhang, and Yuan 2017). In many cases, selling occurs via real-time auctions that run for less than 100 milliseconds (for reference, a blink of an eye takes 200-400 milliseconds). Ad exchanges (e.g., Xandr), marketplaces that connect advertisers and publishers, frequently serve as platforms for such real-time auctions (Cristal 2014, Kosorin 2016, Lee, Jalali, and Dasdan 2013, Information Commissioner's Office 2019; Ada, Abou Nabout, and McDonnell Feit 2022).

Figure 4 illustrates the automated auction process under real-time bidding. For convenience, we refer to a scenario in which an ad slot is being sold on a website, but the general process we describe is applicable to other online media that belong to a publisher and contain ad slots, such as apps. As shown in the figure, whenever a user visits a publisher's website with ad slots (1), the publisher sends an ad call to an ad exchange (2). This ad call is a request to run a real-time auction on the ad exchange and contains information about, for example, the properties of the ad slot (e.g., ad size) and a user ID, which we explain in more detail in Section 3.1. The ad exchange then sends a bid request to all advertisers on the ad exchange (3). Each interested advertiser submits a bid for displaying its ad to the user; the bid also includes the ad server's address with the ad (4). The ad exchange determines the price and the winner of the auction and forwards this information to the publisher (5). The publisher then asks the user's browser to load the ad from the ad server (6), and the ad is subsequently displayed to the user on the publisher's website (7).

Figure 4: *Illustration of the Auction Process in Real-Time Bidding (RTB)*

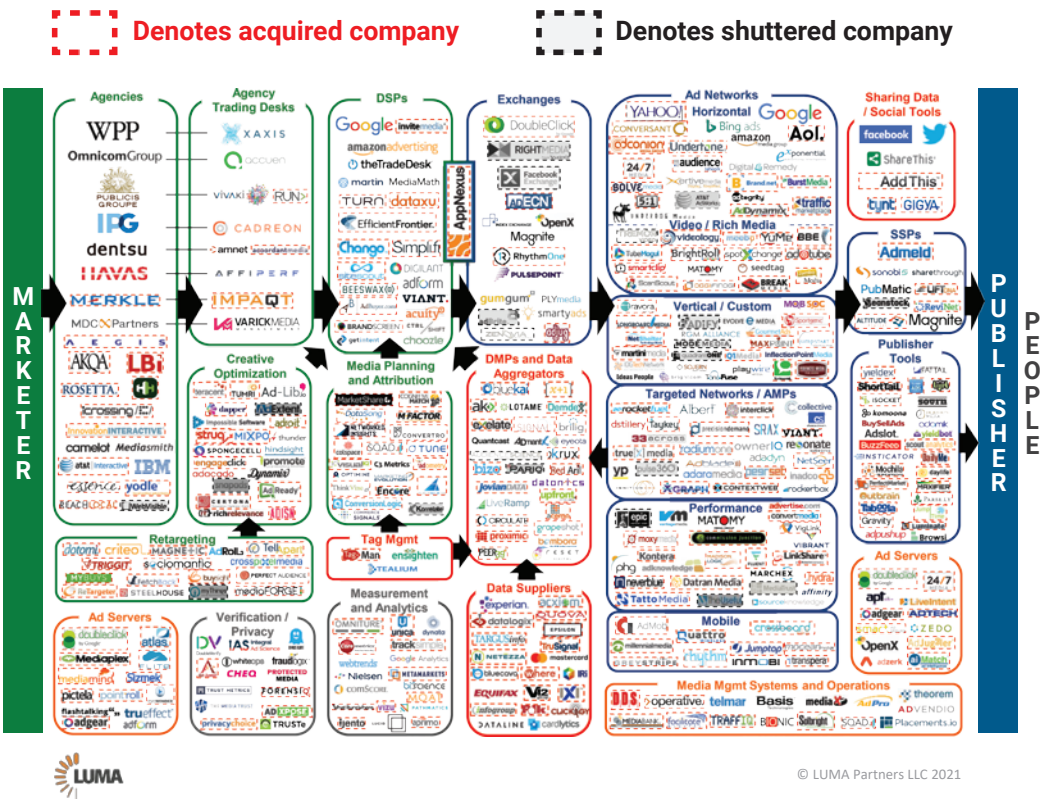


This description of the real-time auction process is a simplification, because it only captures essential steps (for more details, see Cristal 2014, Kosorin 2016, Trusov, Ma, and Jamal 2016 or Wang, Zhang, and Yuan 2017). It does not consider, for example, the specific requirements imposed by privacy laws such as the GDPR (which we will outline later in Section 6 when discussing the Transparency and Consent Framework (TCF)). In addition, it is important to acknowledge that there are many other actors that support the activities of advertisers and publishers (Luma Partners 2021). We describe these other actors in the following subsection.

2.4 Description of Other Actors

Figure 5 classifies the numerous actors in the online advertising industry into several main groups that we will not all cover here.

Figure 5: *Overview of Actors in the Online Advertising Industry (DisplayLUMAscape)*



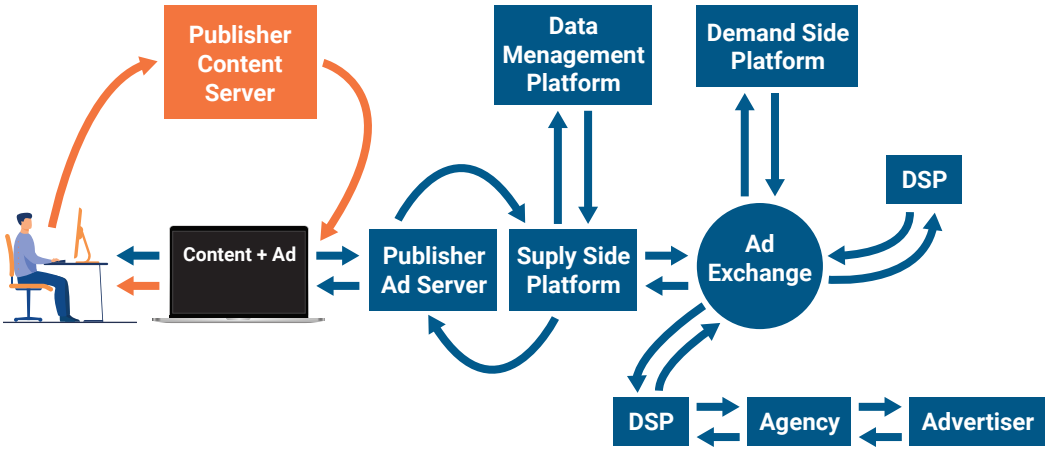
Note that Luma Partners (2021) refer in this figure to an advertiser as a "marketer" and to users as "people".

An ad exchange, as noted above, is a marketplace where the demand side, i.e., advertisers, and the supply side, i.e., publishers, meet to fill ad slots (offered by publishers) with ads (provided by advertisers). A demand-side platform (DSP) is a technology provider that supports the advertiser buying ad slots. A supply-side platform (SSP) provides technology to support the publisher selling its ad slots. An advertising agency helps the advertiser with the creation of the ad. An ad server is a web server (i.e., a computer) that stores advertising content (e.g., banner ads). It delivers that content to the publisher's ad slot and, thus, the user (in our setting, the user's browser).

Many additional actors exist that support the process of selling ad slots and delivering ads to those ad slots. Among them are data management platforms (DMPs), which provide data about the user (e.g., demographics or user interests), or verification providers that verify that an ad appears on the correct publisher. The advertiser and the publisher have to finance all actors. As a result, the price that the advertiser pays for an ad is often much higher than the amount that the publisher receives. Google, for example, outlines that its publishers received over 69% of the money that the advertiser paid (Hsiao 2020). The share of the money that the publisher receives goes further down if the seller and buying of ads involve more actors. For example, the Guardian reports that this share can drop to 30% (Pidgeon 2016).

Figure 6 provides a schematic illustration of how the various actors operate together to produce what the user ultimately views (in terms of both content and ads). In effect, when the user visits a publisher's website (e.g., a news website), two processes are initiated. The first process (marked in orange) delivers the website's primary content (in our example, news content). This content is available on the publisher's content server. The second process (marked in blue) is the process through which ads slots are sold and ads are delivered to the user. Our discussion focuses on the latter process; accordingly, in Figure 6, the process marked in orange is simplified and does not include other actors that may be involved in content delivery, such as measurement and analytics providers that track, for example, how often a user saw certain content and that help the publisher optimize its content.

Figure 6: *Delivery of Content and Ads from the User's Perspective when Visiting a Website*



The process of selling ad slots and delivering ads involves the following steps. The publisher's ad server recognizes an available ad slot (usually even multiple ad slots) that the publisher would like to fill with an ad. The ad server approaches the supply-side platform (SSP) with a request to sell the ad slot on the ad exchange. The SSP sets up the auction on the ad exchange, and the ad exchange approaches the advertisers, usually via several demand-side platforms (DSPs), with a request for a quote for the ad slot, i.e., offering the opportunity to buy the opportunity to display an ad to the specific user. It is essential to understand that any data that the publisher reveals can spread to many other actors. That is a concern that Ryan (2018) raises. He outlines that it is technically feasible to share a wide range of information along the chain outlined in Figure 6. Such sharing raises privacy concerns. It is, however, less clear whether and how intensively sharing of personal data occurs.

2.5 Main Takeaways

The main takeaways from Section 2 are:

- The three main actors in the online advertising industry are advertisers, publishers, and users. Between each pair of actors, a transaction takes place—whether implicitly or explicitly agreed upon.
- 70% of online advertising occurs on mobile devices (including smartphones and tablets). The main advertising formats are search engine advertising, online display advertising and video advertising.

- Real-time bidding is the primary process through which the selling of display advertising occurs. Data sharing in real-time bidding is a source of privacy concerns.
- Many publishers rely on advertising to finance their content. They often do not charge users, but users then pay by providing publishers and advertisers (often implicitly) with data, as well as willingness to view ads.
- Selling and displaying online (display) advertising involves many different actors and requires sophisticated technologies. Indeed, the online advertising industry is effectively a high-tech industry.