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PROGRAMMATIC ADVERTISING AND ONLINE PUBLISHERS: THE CASE OF LIBERTATEA.RO

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Abstract:

Programmatic advertising rose in the early 2000s, aiming at streamlining the online media buying process. It offered marketers the means to buy millions of advertising impressions instantly and helped publishers increase their revenues. The deployment of automated algorithms for media trading led to a significant decrease in campaign setup and management costs and created a new revenue stream for online publishers. However, by the late 2010s, the emergence of ever more complex algorithms and the opaque practices of the Advertising Technology (AdTech) companies in charge of them have led to complaints that programmatic advertising functions largely as a "black box". This article inquires into the programmatic media trading process, with a focus on the impact of the algorithms' increased sophistication on the monetization strategies of online publishers. We analyze the case of Libertatea.ro, a leading Romanian newspaper, in its attempt to offset the decrease of revenue from printed circulation by increasing revenues generated through its online website. The findings show that publishers are forced to apply increasingly complex website monetization strategies. This can, in turn, lead to a loss of control over their advertising inventory and decreased bargaining power when facing AdTech companies, thus threatening the economic models of online publishing.

Key words: *online advertising, digital advertising, programmatic advertising, digital economics*

1. Introduction

In the past decade, the circulation of Romanian newspapers has fallen by 77%. As of June 2022, the newspaper with the highest circulation, a tabloid, barely managed to reach a volume of 37.709 copies, while the most popular printed publication in Romania is the free magazine that a leading supermarket chain distributes for free, with more than 5 million

copies each month. In the last decade, many publishers turned to online advertising in order to compensate the loss of revenue from a declining printed media circulation. However, their monetization strategies must take into account the complexity of the programmatic supply chain. This paper analyzes the challenges that online publishers are facing in their attempt to reach a sustainable economic model, presenting the case of Libertatea, a leading Romanian journal.

The rise of Internet has forced newspapers to adapt to new consumption habits, searching for new economic models, mainly based on the sale of online advertising space. The same holds true for Romania. Romanian scholars have inquired into the subject, however no economic analysis of the online publishers' monetization strategies exists to date. Codău (2014) provides a very useful overview of the economic challenges that Romanian publishers face in their quest for rentability. Grancea (2017) inquiries into the impact of technology on the decline of Romanian journalism, comparing the situation in our country with the case of Japan. A more recent study by Bader and Sîrb (2022), further investigates the perspectives and challenges of Romanian independent media publishers. Other notable contributions are the papers published by Petcu (2013), Seceleanu (2009) and Urs (2013). A special mention must be made concerning a master thesis by Zubascu (2013), analyzing the actors that have the most influence over the Romanian journals. However, none of these works, while definitely valuable, provides an in-depth analysis of the economic models of Romanian online publishers.

Given the increasing reliance of Romanian journals on Internet advertising for revenue generation, this paper aims at filling the knowledge gap, offering a pioneer analysis of the monetization strategies of Libertatea, a leading Romanian news journal. The topic's relevance is ever more obvious if we take into account that many Romanian journals completely shut down their printed versions in the past decade, relying solely on their online media outlets. The latest title is Gazeta Sporturilor, a mainstay of the Romanian media landscape, which closed down its printed version in November 2023, after 99 years of activity.

The work begins with a presentation of the online advertising market, including the conflicting objectives of publishers and advertisers and the role of Advertising Technology in the market's functioning. We further inquire into the role of online media trading algorithms and we provide a brief presentation of the programmatic media buying process. In the next section, a case study is analyzed, that of Libertatea, a leading Romanian newspaper, with a strong printed and online presence. The paper concludes with a final section in which we critically review the findings of this paper, including its limitations, and propose future research directions.

2. The online advertising market

2.1 The main participants and their objectives

The functioning of the online advertising market is the result of a dynamic interplay between the objectives of publishers, advertisers, and advertising technology (AdTech) companies (Tinelli, 2022). Since advertisers and publishers often have conflicting objectives, the most important role of the marketplace is to ensure that demand for advertising space is

paired with the right supply source (Stern et al., 1996). The efficiency of the marketplace is measured by the accuracy of this matching, in providing advertisers with the performance they desire and, at the same time, enabling publishers to achieve their financial goals (Goldfarb et al., 2015).

Publishers aim to generate revenue by selling advertising space on their websites or mobile apps. They seek to maximize their earnings, which involves achieving a high fill rate, meaning that the highest percentage possible of available ad inventory is sold and filled with ads, and the highest sale price for the said inventory. The publishers are striving to minimize unsold ad space and maximize actual revenue. Ideally, the publishers aim at selling the entirety of their advertising inventory at the highest possible price.

At the same time, user experience is important for publishers. Internet editors want to provide a positive user experience to retain and engage their audience. Finding the right equilibrium between the number and placement of ads and the website's content is crucial to avoid overwhelming users with excessive and intrusive advertising. A website that provides a sub-optimal user experience to visitors, through slow loading time and/or too many/too intrusive advertising banners will, in the long run, lose visitors (Eouzan et al, 2016). The loss of visitors directly impacts the publisher's revenue in a negative way, since a smaller audience limits the budget that advertisers can spend on the said website. Adding to this is the fact that, for most publishers, the website is not just a tool for generating advertising revenue, but also a crucial tool for promoting their content, creating a loyal base of users and achieving their long-term editorial goals. This is especially true since the sales volume of printed media titles have registered a significant decrease in the past decade, which threatens the traditional, printed-media based, publisher economic model (Chiou and Tucker, 2017). As such, publishers face a constant tension between generating more advertising revenue and growing a loyal base of satisfied readers (Chaffeym et al., 2017).

On the other hand, **advertisers** wish to reach their target audience effectively. They want their ads to be displayed to users who are the most likely to be interested in their products or services, increasing the chances of generating conversions. In doing so, advertisers seek a return on investment (ROI) and measure campaign performance based on metrics like click-through rates, conversions, cost per acquisition, and other key performance indicators (Belvaux and Notebaert, 2015).

In addition to increasing their Return on Advertising Spend (ROAS) advertisers often aim to increase brand visibility and awareness among their target audience (Kotler et al. 2021). They want to establish a positive brand image and create long-term brand recall. Beyond advertising impressions, what advertisers are really looking to buy is the target audience's attention towards their offer and/or their brand. Publishers create content that attract the public's attention, and advertisers pay for access to this public. As such, advertisers are subsidizing the publishers' activity and are, in theory, co-interested in creating quality content and journalism.

Matching the right campaign (advertiser) with the right audience (publisher) is the key to the efficient functioning of the online advertising market. The difficulty of the task lies not just in the determining the right audience for a given advertising message, but also in providing a high degree of alignment of the often competing goals of advertisers and publishers. As such, the management of online advertising campaigns became an

increasingly arduous and ineffective task. A whole suite of programmatic solutions has emerged, in order to simplify and optimize the media trading process. These intermediaries connect the supply and the demand, allowing for large economies of scale.

2.2. Intermediaries and the practice of multi-homing

As the digital advertising ecosystem has grown, it has become more intricate. It includes a wide range of intermediaries, such as ad exchanges, supply-side platforms (SSPs), demand-side platforms (DSPs), data management platforms (DMPs), ad networks, and agencies, each offering their services to facilitate the buying and selling of ad inventory. Intermediaries (AdTech platforms) play a crucial role in the market's functioning, by providing the technological infrastructure and tools that enable advertisers to reach their target audiences and optimize their advertising campaigns. In doing so, they help connecting the demand and the supply for online advertising space, effectively creating a marketplace for online advertising space. However, in the process, the intermediaries (AdTech companies) have gained de facto control of the market, as the high degree of technological complexity means that advertisers and publishers are now reliant on these companies for reaching their goals. Increasingly, advertisers and publishers alike complain of a loss of control over their campaigns, with algorithms functioning as ''black boxes'', a situation which is detrimental to the market's optimal functioning.

AdTech companies provide services such as audience targeting, data reporting, brand safety and brand quality compliance and many others. Each of these services incurs a cost for the publishers and the advertisers that use them. Each intermediary typically charges fees or commissions for their services. These fees can include ad serving fees, data targeting fees, verification fees, and more. The prevalent business model of the AdTech services providers is to pocket a percentage of the advertiser's media investment and/or publisher's media earnings. The amount of this commission is either fixed (a minimum monthly fee for using the intermediary's platform/ services) or dynamic (a percentage based on the number of advertising impressions that were served through the intermediary's platform).

The overall proportion of advertiser expenditure that is collected by ad tech intermediaries may have a significant influence both on the income that website publishers make from advertising and on the return on investment that advertisers obtain from the advertising campaigns they run. However, this proportion is often not given in its whole to neither the publishers nor the advertisers; certain costs are published solely to the publishers or the advertisers, while other payments are masked or not disclosed at all. Accurately mapping the fees taken by each participant in the programmatic supply chain is an arduous task. Estimates vary from 25 to more than 70%. A study by the Incorporated Society of British Advertisers (2020) shows that, on average, the AdTech intermediaries take up to 50% of the budget an advertiser invests in media buying. No such study has ever been conducted in Romania, however an estimate by the Romanian Bureau for Transmedia Audit president, Dragoș Stanca, places the intermediaries' share of the advertisers' budget at an astonishing 80% (Economica.net, 2018). This means that, out of a dollar that the advertiser spends for buying online advertising space, the AdTech companies will take 80 cents, while the publishers will only pocket 20 cents.

Some intermediaries may add markups to the cost of inventory or charge hidden fees. Given the lack of transparency from the AdTech companies regarding the workings of their proprietary media trading algorithms and the high number of intermediaries (DSPs, SSPs, DMPs etc.) that play a role in the media trading process, many publishers and advertisers complain that they lack the skills needed to make the best use of the technology. Some even complain of an ‘’AdTech Tax’’, which refers to refers to the cumulative fees, commissions, and markups that various intermediaries within the advertising technology (AdTech) ecosystem charge for their services in the process of delivering digital advertising campaigns. This tax can significantly reduce the share of ad revenue that publishers receive and increase the overall costs for advertisers (Ungureanu and Popescu, 2022).

In order to increase their revenues and reduce the chances of incurring the said AdTech Tax, publishers may opt to offer their inventory for sale through more than one ad exchange, a practice referred to as "**multi-homing**". This practice is mostly adopted by large publishers in general, since it requires the usage of a publisher ad server and adds an extra layer of media trading complexity. Multi homing increases the possibility that an advertiser on one or more of the ad exchanges will be able to "match" the advertising opportunity supplied by the publisher to a user or type of user that an advertiser especially values and is therefore prepared to compete to purchase. When publishers have the ability to make their inventory available for purchase through a number of different ad exchanges at the same time, it forces the various ad exchanges to compete with one another in order to give the greatest "match" or the lowest revenue share. However, there are fees involved with the integration of each additional ad exchange that the publisher adds. These costs include contracting and other administrative tasks.

In a similar manner, advertisers frequently connect with several ad exchanges through their advertiser purchasing tools in the hope that exposure to as much advertising inventory as possible would maximize the possibility of reaching the advertisers' target audiences for their advertising campaigns at the most affordable price. Advertisers also have the ability to evaluate the performance of different ad exchanges when they use numerous ad exchanges. In a similar vein, allowing advertisers the freedom to freely multi-home among different ad exchanges compels those ad exchanges to compete with one another in order to offer advertisers the most return possible on the money they spend on advertising.

However, multi-homing is not a generalized practice. As previously mentioned, it adds an extra degree of complexity, as it requires using a publisher ad server and the technical skills needed to run it effectively. Another problem lies in ensuring the accurate tracking of the available inventory, sold ad impressions and the revenue that was generated.

2.3. The role of media trading algorithms

The increase in the number of intermediaries in the ecosystem has led to a fragmented and complex supply chain. The industry’s response was the development of automation on a massive scale (Edelman et al. 2007). Various Advertising Technology (AdTech) companies provide automated tools that facilitate the online media trading process, reducing the need of manual human intervention. Automated media algorithms are tasked with pairing the demand and the offer and are responsible, each second, for billions of media arbitrages. For accurate decision making, these algorithms are fed by a

tremendous amount of data, mainly related to the users' internet behavior. Various ''clues'' are collected and analyzed by the dedicated software programs, in order to create homogenous audiences that will be used in online advertising. For years, this process happened with little supervision from the legal authorities, which has opened the door for privacy breaches and potential market abuses (Goldberg et al., 2019). However, in the past years, especially since the introduction of stronger regulations through the GDPR act, AdTech companies have been forced to review their activity and the way user data is collected, stored and used (Gerardin and Katsifis, 2019).

The leading AdTech companies have all developed proprietary algorithms, designed to simplify the media buying process and optimize the results for advertisers. These algorithms are part of an arms race between the main players in the market, since a more efficient media trading process offers a tremendously powerful competitive advantage for the company that manages to provide advertisers with better results (Jeon, 2021). Given the intense competition on the AdTech market, companies are following a policy of limiting the amount of information that is made publicly available about the workings of their algorithms. This makes it very difficult to analyze how the algorithms used in programmatic advertising affect the market's functioning (Mansour et al., 2012). The lack of transparency has long been deplored by advertisers and publishers alike, who complain that, in practice, these algorithms function as ''black boxes'' (Srinivasan, 2020).

The main role of algorithms is to efficiently match demand and supply. Programmatic algorithms use audience data and targeting parameters to match relevant ads with specific audience segments (Renaud, 2017). From a supply (publisher) perspective, algorithms help publishers manage their inventory more effectively by optimizing the allocation of ad space across various demand sources. This ensures maximum revenue generation from their available inventory. At the same time, algorithms analyze real-time bidding data and market conditions to set optimal prices for ad impressions. This helps publishers maximize their yield by adjusting prices based on demand and supply dynamics.

From a demand (advertiser) perspective, algorithms analyze vast amounts of data, including user behavior, demographics, and contextual factors, to identify and target the most relevant audiences for advertisers, which in turn improves the effectiveness and efficiency of ad campaigns. Moving beyond the ad targeting, algorithms enable advertisers to make data-driven decisions in real-time. They automatically adjust bidding strategies, creative elements, and targeting parameters to optimize campaign performance and achieve desired outcomes. This leads to improved campaign efficiency and better return on investment (ROI), which is one of programmatic advertising's selling propositions (Mayer, 2016).

2.4 The programmatic media buying process

Programmatic advertising involves the automated buying and selling of digital ad inventory in real-time auctions. It encompasses a range of technologies, platforms, and processes, making it inherently complex. As the internet user base grew, online advertising became more attractive to advertisers. Advertisers sought more effective ways to reach specific audiences online, leading to the need for more advanced targeting methods. This is one of the key drivers of the increasing complexity of programmatic advertising.

The whole programmatic media buying process occurs within milliseconds, allowing for real-time decision-making and ad delivery. Except for making sure that the advertising inventory is available (on the publisher side) and that the campaign is correctly set up (on the advertiser side), no human intervention is required. Advertisers and publishers can make changes into the campaigns, however, given the sheer amount of data required for deep optimization, in practice it is mostly the algorithms that are tasked with ensuring that the campaign achieves its objectives (Hirth, 2017). More advanced options exists, in order to give publishers more control over their advertising inventory, such as using header bidding (Aqeel et al., 2020) or the waterfall system (Gerardin and Katsifis, idem). While capable of increasing publishers' revenues, these media trading methods are even more complex, requiring advanced technical skills. As such, these monetization tactics are not widely used by small and medium publishers.

While multiple scenarios are possible when running programmatic display advertising (Allary and Balusseau, 2018), in practice, given Google's dominance of the programmatic advertising market, the company's products will play a major part in any online media trading process, regardless of the technical setup or the scenario involved. As of 2022, Google's market share of the AdTech market was estimated, by the United States Department of Justice (2023), to range between 40% and 90%, depending on the product – see Table 1.

Table 1: Google's share of the programmatic AdTech market

Technology	Google product	Google's market share
Publisher ad server	Google Ad Manager (ADM)	90%
Ad exchange	Google Ad Exchange (ADX)	50%
Advertiser ad network	Google Ads	80%
Demand side platform (DSP)	Google Display & Video 360	40%

Source: Authors' work

3. Case Study: Libertatea.ro

3.1 An analysis of Libertatea.ro's ads.txt file

This section will showcase some of the monetization strategies of Libertatea, a leading Romanian newspaper. The first newspaper to be founded after the fall of the communist regime, on 22 December 1989, Libertatea was acquired in 1994 by Ringier, a leading international media group, and has access to both local and international website monetization expertise. A mainstay of the Romanian journalism, Libertatea is a one of Romania's leading newspapers, both counted by its printed circulation and its online traffic. Libertatea's online economic model can only be understood in the wider context of the Romanian publishing market. In the past decade, the printed circulation of Romanian newspapers has fallen dramatically. The figures published by BRAT, the leading Romanian publisher association, show that, in April – June 2012, the average total combined circulation of Romanian paid printed media was of 1.733.620 per month. For the same period of 2022, the total circulation had fallen to 398.340, a decline of 77%. This fall of printed circulation

has been accompanied by a growth of the traffic of Romanian publishers' websites. In May 2012, Romanian publishers had recorded 1.089.306.799 page views. In May 2022, the number had more than tripled, to 3.345.602.389 page views (BRAT, 2023).

As for Libertatea, in April – June 2012 the newspaper had an average printed circulation of 142.022 per month. A decade later, their printed circulation had fallen to 22.088, a decline of 84%. This is more than the market's average decline of 77% (BRAT, 2022). The newspaper's website page views also decreased during these 10 years. In May 2012 it had 48.002.044 page views, while in May 2022 it only recorded 41.096.670 page views. In relative terms, Libertatea registered a decrease of 14%. It must be said that Libertatea was a pioneer of online journalism, being one of the first Romanian newspapers to establish a strong online presence. The decline in the number of page views on its website can be attributed to increased competition, as more and more media outlets increased their online presence (Dina and Teodorescu, 2014). During this period, many Romanian publishers decided to close their printed divisions and focus exclusively on online, as a result of the losses they have incured. The most recent example is one of Libertatea's sister publications, Gazeta Sporturilor, which is also a member of Ringier media group. This phenomenon threatens directly Libertatea's printed edition, which might be the next to be shut down (RFI, 2023). As such, it is ever more important to understand whether Libertatea.ro's monetization strategy can make up for the loss of the printed circulation and ensure the viability of its journalistic act.

In order to understand Libertatea's approach to monetizing its online assets, we have started by analyzing its ads.txt file. Ads.txt, which stands for Authorized Digital Sellers, is a standard initiative within the digital advertising industry designed to prevent advertising fraud, increase transparency, and ensure that advertisers are buying ad inventory from legitimate sources. It is a text file that publishers create and host on their web servers to declare the authorized sellers of their ad inventory. Ads.txt enhances transparency by providing a clear list of authorized sellers for a publisher's inventory. By creating a transparent record of authorized digital sellers, ads.txt helps ensure that advertisers are buying ad inventory from legitimate sources, reducing the risk of fraudulent activities in the digital advertising ecosystem. However, its effectiveness depends on broad adoption and proper implementation by both publishers and advertising platforms (Bashir et al., 2019).
Ads.txt files are placed in the domain's root and are made public by default. Thus, Libertatea's ads.txt is available at the following Internet address: https://libertatea.ro/ads.txt. As of October 2023, when we have consulted the file, it consisted of 1158 lines, including all the entities which are allowed to purchase advertising impressions on the website. Each line in an ads.txt file represents a relationship with a different entity authorized to sell their ad inventory. A sample of the file is presented in Table 2.

Field 1 is the domain name of the advertising system that is authorized to sell the publisher's ad inventory for example, "projectagora.com." Field 2 is an ID identifies the publisher's account within the advertising system. It's a way for the publisher to specify which account or entity can sell their inventory. Field 3 describes whether that entity is a direct seller or a reseller. "DIRECT" means that the publisher has a direct relationship with the advertising system, indicating they are the primary source for selling their inventory. "RESELLER" indicates that the advertising system is an authorized intermediary or reseller

of the inventory. In this case, the advertising system may work with multiple publishers. Field 4 shows the certification authority ID to verify the authenticity of the entry. This field is optional.

Table 2: A sample of Libertatea.ro's ads.txt file

Field 1 - Domain name	Field 2 - Publisher ID	Field 3 - Relationship Type	Field 4 - Certification Authority ID
loopme.com	5679	DIRECT	6c8d5f95897a5a3b
xad.com	958	DIRECT	81cbf0a75a5e0e9a
rhythmone.com	2564526802	DIRECT	a670c89d4a324e47
smaato.com	1100044045	DIRECT	07bcf65f187117b4
pubnative.net	1006576	DIRECT	d641df8625486a7b
sovrn.com	278011	DIRECT	fafdf38b16bf6b2b
lijit.com	278011	DIRECT	fafdf38b16bf6b2b
lijit.com	278011-eb	DIRECT	fafdf38b16bf6b2b
appnexus.com	1360	RESELLER	f5ab79cb980f11d1
gumgum.com	11645	RESELLER	ffdef49475d318a9
openx.com	538959099	RESELLER	6a698e2ec38604c6
openx.com	539924617	RESELLER	6a698e2ec38604c6
pubmatic.com	137711	RESELLER	5d62403b186f2ace
pubmatic.com	156212	RESELLER	5d62403b186f2ace
pubmatic.com	156700	RESELLER	5d62403b186f2ace
rubiconproject.com	17960	RESELLER	0bfd66d529a55807
amxrtb.com	105199426	DIRECT	
indexexchange.com	191503	RESELLER	
appnexus.com	11786	RESELLER	
appnexus.com	12290	RESELLER	

Source: Authors' work

A summary of Libertatea.ro's ads.txt files shows that there are 1158 methods or paths through which authorized entities can purchase advertising impressions on this internet domain. However, the file also shows that certain entities have more than one line, meaning that they use more than one trading method. As such, the number of unique entities authorized to purchase ad impressions is lower, especially once we take into account the non-existing seats, or corrupted lines, which don't correspond to a real trading path anymore. The authorized entities' distribution by type is shown in Table 3.

Table 3: Libertatea.ro's ads.txt file lines by type

Indicator	Value
Total number of ads.txt lines	1158
Authorized sellers - Direct	75
Authorized sellers - Reseller	151
Authorized Ad Exchanges	140
Non existing seats	318

Source: Authors' work

In practice, it is impossible to fully comprehend how all of these supply chain function and how the publisher ad server that Libertatea uses (which is Google's AdManager) selects the winner for a given ad impression. However, the file does show that Libertatea is adept at using multi-homing, authorizing 140 ad exchanges to buy its advertising inventory.

3.2 A critical analysis of Libertatea.ro's online monetization strategy

Libertatea.ro was, in the first semester of 2022, the Romanian media website with the 5th highest earnings, as reported by BRAT. This ranking does not stem exclusively from its traffic volume, as Libertatea was, during the same period, the 12th most visited Romanian media outlet. Part of this good performance can be attributed to its online media trading setup, which focuses on multi homing and on advanced monetization strategies. However, this is not without its challenges, as we will explore in this section.

Using a dedicated parsing tool, we have managed to generate a graph illustrating a part of Libertatea's supply chain, represented in Figure 1.

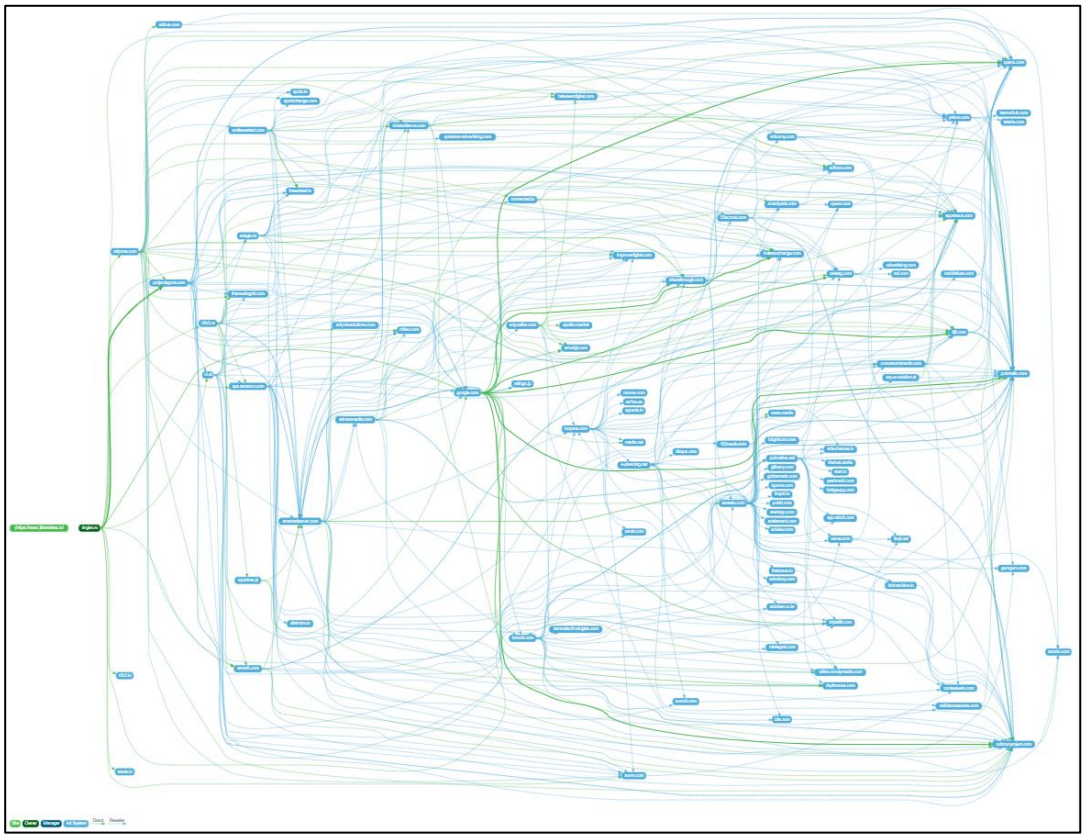
As we can see, Libertatea's supply path is so complex that, even when using dedicated tools, it remains unintelligible. Another way to try and understand Libertatea's supply path is to analyze the external entities which are allowed to depose cookies on users visiting one of its webpages. According to CookiePro, the consent management tools that Libertatea uses, 203 advertising entities are allowed to depose cookies on Libertatea's visitors, in order to better track the users' activities.

The high number of lines in Libertatea's ads.txt file derives from the publisher's quest to increase the revenue the website generates. Libertatea works with various demand partners, including different ad networks, agencies, and platforms, in order to make its inventory available to as many demand sources as possible and increase competition for its advertising inventory. Each of these entities may have its own specific way of buying and selling ad inventory and Libertatea had to create individual lines for each one of them in their ads.txt files. At the same time, publishers want to ensure that their ad inventory is being sold to legitimate advertisers and that there is transparency regarding the intermediaries involved. Having multiple lines in the ads.txt file allows Libertatea to disclose their relationships with various partners, providing transparency into the supply chain.

Another reason lies in the fact that the online advertising ecosystem is highly fragmented, with various players specializing in different areas. As such, publishers may choose to work with multiple entities to maximize their reach and revenue (George and

Hogendron, 2012). Publishers may have different types of ad inventory, and each demand partner may be interested in specific segments or audiences. Given that Libertatea is one of the leading Romanian online newspapers, and one of the most technologically advanced, competition among advertisers and DSPs for valuable ad inventory may lead to multiple entities seeking direct or reseller relationships with the publisher.

Figure 1: A visual representation of Libertatea.ro supply paths



Source: Authors' work

Trade-offs between website usability, content quality and revenue generations are a key concern for online publishers (Aribarg and Schwartz, 2020). Finding the right balance is a difficult task, especially since the programmatic advertising ecosystem is characterized by a high degree of concentration, with Google controlling the programmatic supply chain, and by a lack of transparency that creates an informational asymmetry. The main issue at hand is whether this loss of control and decrease website usability (due to slower loading, more complex supply paths) can generate enough revenue for the publisher

Although Libertatea.ro is one of the most technologically advanced Romanian online publishers, making use of a dedicated ad server and benefiting from group know-how originating from its membership in the international Ringier media group, their supply chain setup is not ideal. There are 318 non-existing seats in their ads.txt files, which amounts to more than 25% of the total number of lines. This can potentially affect their revenues, as those lines are unrecognized by the Demand Side Platforms used by advertisers looking to

purchase ad impressions on the website. As such, those advertisers will be unable to make the purchase, which can potentially lead to lower revenues for Libertatea, as less demand will compete for the said impression. At the same time, the sheer number of ads.txt lines makes it impossible to fully comprehend how the supply chain actually functions. This reduces the publisher's control over its inventory and its monetization strategies.

As previously shown, there are, in theory, 1158 ways to buy advertising impressions on Libertatea.ro. If we exclude the non-existing seats, we are left with 840 valid trading paths, which is still an overwhelming number. This situation is far from ideal, since advertisers and agencies may not have a clear understanding of the best path to reach their desired audiences, leading to wasted resources (Pastor et al, 2020). The multitude of intermediaries can make it challenging to know where ad spend is going, leading to concerns about fraud, hidden fees, and ad quality. With a significant number of intermediaries, there is potential for a substantial portion of ad spend to be consumed by fees before reaching publishers. At the same time, managing relationships with numerous intermediaries can be administratively burdensome, as publishers need to ensure they are in compliance with their partners' requirements, including technical integration, ad quality, and performance tracking. The fact that more than a quarter of Libertatea's ads.txt lines are broken is direct evidence of the difficulty of managing such a complex supply path.

The ever increasing complexity of the programmatic advertising ecosystem gave birth to a strategy called Supply Path Optimization (SPO), which aims to enhance the efficiency and transparency of the supply chain by optimizing the paths through which ad inventory is bought and sold. It involves advertisers, agencies, and demand-side platforms (DSPs) selecting the most direct and cost-effective routes to access a publisher's ad inventory. SPO is necessary to address issues of inefficiency, lack of transparency, and to improve the overall effectiveness of programmatic advertising (Musku and Yadav, 2021). This is one of the strategies that Libertatea should implement in order to improve its supply chain and increase revenues.

4. Conclusions

Given the significant drop in printed media circulation, publishers are facing some hard choices in their attempt to improve their revenues. Growing their online presence and monetizing the advertising inventory is one of the strategies that can help publishers offset some of the lost revenue that derives from the drop in printed circulation. This is also the case of Libertatea, which has been a pioneer of the digital transformation and is one of the most visited Romanian online newspapers. However, this switch is not without challenges. While Libertatea's printed circulation has dropped by 84% between 2012 and 2022 (BRAT, 2023), the number of page views on its website has also registered a decrease of 14%. Less page views mean that less advertising inventory is available, which usually triggers a decrease of the revenues that the website can generate.

An analysis of Libertatea's ads.txt file provides useful information regarding their monetization strategy. Libertatea has fully embraced the concept of multi-homing, making its advertising inventory available to multiple ad exchanges. This is a move designed to open additional demand sources and increase competition for its advertising inventory, which in

turn aims at increasing the revenue that the publisher earns from selling this commodity. In Libertatea's case, 366 entities are allowed to buy ad impressions on the website: 75 direct sellers, 151 resellers and 140 ad exchanges. While this setup ensures that all potential buyers are allowed to bid for advertising impressions, it also adds a great deal of technical complexity. There are 318 non existing seats in Libertatea's ads.txt file, a testimony of the difficulty of managing such a large supply chain.

Parsing Libertatea's programmatic supply chain showed that the paths are not optimized. It is impossible to fully comprehend how all the various demand sources are called upon and which is their priority, even when using a specialized tool. This is a significant issue, since it reduces the control that Libertatea has over its own inventory. At the same time, it can lead to a suboptimal bidding process, as it can increase the webpage's loading time and decrease the certainty that the highest bidder wins systematically the auction. With such a complex supply path, double-checking that the bidding process works optimally is de facto impossible.

The challenges that Libertatea faces in finding the right balance between content quality and inventory monetization are not unique (Aribarg and Schwartz, 2020). They are common to an industry that has grown ever more reliant on opaque AdTech platforms and ''black-box'' media trading algorithms. The need for a viable economic model for online publishers becomes even more urgent when we take into account the decline of printed media. Ringier, the international media group that Libertatea belongs to, has recently decided to shut down the printed division of Gazeta Sporturilor, one of Libertatea's sister publications, citing the losses the media outlet had generated in the past years and its decreasing circulation (Pagina de Media, 2023). While Libertatea is the 5th highest grossing Romanian online publisher (BRAT, 2022), it is unclear whether its activity is profitable. Throughout the 2012 – 2022 time period, its mother company, Ringer Romania, recorded a total loss of more than 26 million RON, which cast doubts over the economic viability of Libertatea's current model.

Until recently, there has been little scrutiny on how the current structure of the online advertising market affects the economic models of publishers and content creators. Recent inquiries by various states (mainly the European Union and the United States) have started shedding light on some the practices of the main AdTech players (Policy Department for Citizens' Rights and Constitutional Affairs study, 2021). However, despite the serious progress that has been made into rendering the market more transparent, the actual workings of the media buying algorithms are not completely understood. This is due to their technical complexity and, most of all, due to a by-design lack of transparency from the Ad Tech companies that own them.

In analyzing the results of this study, one must also take into account the inherent limitations that the author faced. As previously mentioned, programmatic advertising is an opaque industry, with companies actively limiting the amount of data that is available concerning their workings. As such, the description of the programmatic media trading process, while accurate, cannot be considered exhaustive. At the same time, Romanian publishers, Libertatea included, are reluctant to disclose their monetization strategies. The requests for information that we have addressed to Libertatea received no reply. This means that we were only able to analyze data that was publically available: the content of the ads.txt

file, Libertatea's public financial recordings, some details about the publisher ad server that they use, through an analysis of their pages source code. Added to this is the fact that no such analysis of a Romanian publisher monetization strategies, exists in the scholarly corpus of knowledge. This paper's findings can serve as a solid base for future inquiries that will expand the knowledge on the topic.

One future direction of research is a critical inquiry into the influence of AdTech platforms which dominate the market (Google and Meta). Google and Meta's duopoly provide a ripe field for possible unethical, or even illegal, business practices. The recent legal action opened against Google and Meta by the European Union and the United States suggest that dominant position abuse is a real possibility. It is important we understand the impact of the business practices of these companies on the economic viability of online journals and, on a wider scale, on the quality of the journalistic act online publishers provide.

Further research is also needed in order to shed more light into the monetization strategies of Romanian publishers and how the current market structure affects the quality of the journalistic act. It is important to understand whether the revenues generated from online advertising can compensate the loss of revenue from printed media. Additionally, future works should investigate the trade-offs that online publishers are forced to make in the quest for a viable economic model, and how the various monetization strategies they use impact their ultimate mission, of correctly informing the public.

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