Journal of Quantitative Description: Digital Media 4(2024), 1–40 10.51685/jqd.2024.018

The platformisation of party politics?: A comparative study of party websites' technological infrastructures 2012-2021

KATE DOMMETT
University of Sheffield, United Kingdom[1]

FENWICK MCKELVEY
Concordia University, Canada

GLENN KEFFORD
Queensland University of Technology, Australia

Political parties' have gone digital. Political scientists in countries around the world have diagnosed the rise of the digital party and traced parties' adoption of digital technology. Existing attempts to understand parties' digital practices have focused on the adoption of different tools, with scholars empirically studying and theorizing how and why digital technology is used. What has received less attention is the technical architecture and origins of these tools, questions that have been more directly examined by political communication scholarship. In this paper we entwine insights from these two disciplines, interrogating the idea of 'platformization' in the context of political technology. Presenting a unique, longitudinal dataset that captures the technological development of political party websites in 66 parties in 16 countries, we provide

[1]Author 1: k.dommett@sheffield.ac.uk
Author 2: fenwick.mckelvey@concordia.ca
Date submitted: 25 October 2024

We would like to acknowledge Luciano Frizzera who played an early role in the development of this paper and trailed data collection.

unprecedented insight into the evolution of party websites and show evidence of increasing platform dependency. Our findings have important implications for our understanding of parties' relationship with technology, showing how technological developments and monopolies can lead to increasingly homogenized practice internationally.

Keywords: political parties, platform politics, digitization, web analytics, privacy, tracking

Over the past two decades scholars have traced parties' adoption of digital technology. Describing the rise of 'digital first' parties and the uptake of digital tools by legacy parties, digital technology has been shown to be an embedded feature of party organization internationally (Barberà et al., 2021; Margetts, 2006). It has therefore become routine for parties to have websites and social media presence (Kruikemeier et al., 2015; Norris, 2003), and to gather and utilize digital trace data to inform their campaign activity (Kefford, 2021). In this new 'fourth era' of communication, web technologies have therefore become routinized (Magin et al., 2017; Römmele and Gibson, 2020). To date, attempts to study parties' use of digital technology have focused on the adoption of different techniques. Political scientists have therefore detailed the use of different media channels and techniques, tracing practice on blogs, social media, websites and mobile devices (Davis, 2009; Gibson et al., 2003; Jackson, 2003; Jackson and Lilleker, 2011; Lilleker et al., 2011; Tromble, 2016; Vaccari, 2014). This work has offered important insights into the intention, practice, and implications of digital adoption from a party perspective, highlighting how technology is perceived, deployed and consequential for society. Whilst important questions, within this paper we draw on insights from political communication to instead interrogate the technical infrastructure that facilitates parties' digital activity. We ask what technology is being used on party websites and how this has evolved over time. Categorizing different 'types' of technology, we aim to reveal more about the aims of the technology being used by parties and reflect on whether 'platformization' - which theorizes that commercial institutions

and specifically digital platform companies can exert power over political systems (Gillespie, 2018; Van Dijck et al., 2018; Dommett, 2021; Kreiss & Jasinski, 2016) - has led parties to converge on the use of certain technologies, regardless of ideological or country-level differences. Such questions, we argue are important for our understanding of the relationship between citizens and parties, spotlighting the power of technology to shape the democratic experience citizens have.

Our analysis is focused particularly on the websites of political parties, a technology Nielsen (2012) observes is one of the 'mundane' technologies that facilitate party activities. Presenting longitudinal data from over 66 parties in 16 countries, we offer an exploratory study that provides evidence in support of the platformization thesis. Specifically, we find widespread adoption of third-party technologies that have increased across all parties. We find that major United States (US) firms are the predominant provider of third-party trackers. As such our paper contributes much needed empirical insight into the technologies embedded on party websites and reveals hitherto opaque technological dependencies which affect how parties' technological adoption practices should be understood.

Literature review

Political science scholars have long studied the ways in which new media affects the political system. This includes scholars examining the perceptions, practice, and implications of numerous technologies, tracing the rise of social media, blogs, mobile applications, among numerous other studies (Davis, 2009; Gibson et al., 2003; Jackson, 2003; Jackson and Lilleker, 2011; Lilleker et al., 2011; Tromble, 2016; Vaccari, 2014). Within this body of work, a key area of the scholarship for our focus in this article has been on the ways that party technologies are constructed and maintained. Seeking to move beyond studies that describe the 'front end' of parties' online presence, scholars such as Gibson have called for additional attention to be given to the 'less visible activities, personnel, and infrastructure (both hardware and software) that lie beneath this outward exterior' (2020; p.6). Such work has drawn attention to the way that parties' digital activities are built and maintained, often highlighting the importance of external

companies and consultancy firms (Farrell et al., 2001). As Dommett et al., (2021) highlight, these organizations not only provide strategic and specialist knowledge, but they also often provide capacity and infrastructure, helping parties to build the architecture of their campaign. Studies such as the analysis of NationBuilder provided by McKelvy and Piebiak (2018) point to similar findings, revealing the role those external actors can play in building digital infrastructure. Nonetheless, it still remains unclear exactly how technologies are constructed, and which specific tools and techniques are combined to build digital campaigning tools. These questions matter because they have consequences for our understanding of citizens' relationship with parties as they can reveal the objectives party websites are designed to achieve and the degree to which parties are reliant on certain external platforms to develop their web infrastructure regardless of ideological or country-level factors.

Efforts within political science to generate insight into the architecture of digital campaigning have tended to focus on descriptive content analysis. This is particularly evident in studies of party websites (Norris, 2001; Gibson et al., 2003; Römmele, 2003, p.9; Toode, 2016; Vaccari, 2008). Seen to have emerged in the mid-1990s (Gibson and Ward, 2009, p.87), the website is a central part of a party's brand (Foot & Schneider, 2006). Much of the early literature on party websites focused on interactive components and the possibilities of digital democracy (Coleman, 2001), leading to studies of practice in Belgium (Hooghe and Vissers, 2009), Austria and Germany (Russman, 2000; Schweitzer, 2005), Finland (Strandberg, 2007), Italy (Vaccari, 2008) and many other contexts. These interests also informed comparative analysis. Norris, for example, conducted a content analysis of the degree of information or interactivity on 134 websites in 15 countries (2003, p.27), whilst Kruikemeier et al. (2015) used content analysis to identify levels of interactivity, political personalization, and mobilization on 63 websites in 5 countries. Foot and Schenider's (2006) seminal work on early campaign websites categorized their functionality. They detailed how websites shifted from "brochureware" to the interactive experiences common today, describing how website features could be used for: Informing; Involving; Connecting; and Mobilizing. These observational studies

provide important insights, but it often remains unclear exactly how these websites are constructed and the degree to which they rely on common or different architectures.

The scholarship on the internet points to three common web eras: Web1.0, an early Web2.0, and the platformed web. The first is strongly associated with static, simple websites with extensive use of third-party technologies. Web 2.0 can be defined, in part, by the introduction of third-party Javascript libraries that allow sites to become more interactive, almost like applications. Simultaneously, websites turned to databases, style sheets, and third-party content management systems to offer richer user experiences, all the while requiring greater use of third-party technologies. More recently, scholars have diagnosed the advent of 'the platformed web' where web2.0's participatory opportunities have consolidated in a few large technology firms. According to Helmond, this can be seen as 'the rise of the platform as the dominant infrastructural and economic model of the social web and the consequences of the expansion of social media platforms into other spaces online' (2015: 6; see also Plantin et al., 2018, p. 3). In the realm of electoral politics, this dominance means that platforms such as Meta, Google, or X (formerly Twitter) exert increased power over political systems and behaviours (Gillespie, 2018; Van Dijck et al., 2018), and play a potential role in parties' activity (Kreiss & Jasinski, 2016). From this perspective, platforms become a key source of innovation and new practice, but they also exert power and create dependencies around the use of their technologies and tools. As Nielsen and Ganter have argued, platforms 'draw many different third parties in by empowering them to do things that each of them value and want, while in the process leading them to become ever-more dependent on the platform in question, increasingly intertwined in highly asymmetric relations' (2022, p.2).

Other contributions to platformization debates have highlighted the way in which platforms become necessary components for the rest of the Internet's websites to operate (Helmond, 2015). Indeed, Blanke and Pybus identified the way platforms intertwine themselves in relation to mobile web applications, identifying how 'platforms have been able to technically integrate themselves into the fabric of the mobile ecosystem, transforming the economic dynamics that allow these largely enclosed entities to compete" (2020 p. 2). Broadly speaking, then, a few very large online platforms provide

critical third-party technologies used across the web ecosystem. Meanwhile, simultaneous to these developments, there has been a growing reliance on advertising for the Internet economy (Crain, 2021). To be profitable, websites must embed third-party technologies to participate in ad exchanges creation - a tendency described by Bounegru et al., (2018) as the "techno-commercial underpinnings of the web". Cumulatively, this work suggests that platform companies are now likely shaping the affordances of websites and it would be logical to assume that this is also true for the websites of democratic actors such as political parties. This trend matters because it suggests that websites, far from exhibiting practices that reflect the ideological imperatives of specific political parties, could be shaped by the logics of platforms. Parties with ethical commitments against surveillance could therefore be utilizing technologies that contradict their ideas because of the dominance of certain platforms and affordances. Previous research has found evidence that parties are increasingly using social media platform technologies and tracking technologies (McKelvey, 2019; Kefford et al., 2023). However, to date there has not been investigation into the precise nature of change over time, and the degree to which ideological or country level variations found in other work to explain variation in party practices (Dommett et al., 2024) inform the architecture of websites. It is these questions we seek to empirically investigate.

Drawing from this literature, we identify five descriptive questions that have the potential to cast light on our understanding of party websites and the effect of platforms on political parties' relationship with digital technology. These questions are:

1. Are third-party technologies being used on party websites?
2. Has usage changed over time?
3. What types of technology are in use?
4. Does ideology or country-specific variables impact usage?
5. Who are the providers of these technologies and are there signs of platformization?

In what follows, we provide an exploratory analysis designed to generate additional empirical insight into current trends, allowing future work to generate and test causal hypotheses.

Methods

Our research fits with a growing field of digital methods concerned with Internet infrastructures. Digital methods refer to technologies that repurpose digital data rather than adapt offline methods to online environments (Rogers, 2013). Most digital methods focus on the use of Application Processing Interfaces (APIs) and scraping to study social activity on social media. We differ as our project repurposes web analytic data to study changes in party technological infrastructure and the growth in platformization (Helmond, 2017). Our project contributes to a growing interest in third-party technologies which are standard practice for web development, but raises important questions of infrastructural dependencies, data flows, and privacy. Comparable studies have investigated third-party infrastructures on climate change related websites (Alperstein, 2019) and on news websites (Libert, 2015). The methods differed in how third-party technologies were analyzed. Libert (2015) used a custom script to detect third-party technologies, whereas Alperstein (2019) repurposed data from the Ghostery adblocking tracker. These approaches allow for a one-time scan but do not afford longitudinal data.

Our project focused deliberately on political parties' websites. Both foci require some justification given debates about the relevance of parties and declining research into party websites. Parties' legitimacy might be in crisis, but the party remains central (Ignazi, 2020). Indeed, despite the rise of other representative organizations, parties remain organizations delivering democratic linkage (Dommett and Rye, 2018), rendering them of ongoing interest. Similarly, we contend that whilst much recent literature focuses on the mediation of parties through social media websites, parties still maintain websites as a central component of their campaign, and they remain key to fundraising, volunteer recruitment and information sharing. We argue that political party websites are a critical site to study changing party digital strategies and infrastructures in a context where many parties are unwilling to disclose or discuss their technological strategies (Dommett and Power, 2021). A study of website technologies bypasses access issues and is also able to overcome the limited memory and tenure of party officials and elites (Kreiss, 2016). A longitudinal study of the technologies employed on party websites can therefore provide

a new perspective on parties' technological development, even as the literature focuses increasingly on social media.

Our approach repurposes data purchased from a commercial web analytics company running since 2007 allowing for research to track the adoption of third-party technologies on the web.[2] This method of analysis is advantageous in that it allows us access to consistent comparative data across many companies, enabling descriptive analysis. We acknowledge that in relying on commercial data our research is subject to some risk, as the dataset is by no means comprehensive. Indeed, one member of the team discovered that the analytics firm had not tracked a major national party in their home country, thereby requiring that country to be removed from the dataset. Our paper nevertheless demonstrates the utility of web analytics data to political communication, sampling issues aside.

In selecting which parties to cover, we initially selected the top 20 advanced democracies in the OECD and then drawing on what data was available to use, built a dataset from the information provided from the commercial web analytics company BuiltWith[3]. Parties from the following countries are included in our analysis: Australia, Austria, Belgium, Denmark, France, Germany, Ireland, Italy, Netherlands, New Zealand, Portugal, Spain, Sweden, Switzerland, United Kingdom, and the US. In total we included 66 parties.[4] Using the Political Party Database Project (Poguntke, Scarrow and Webb, 2017), we attributed an ideological family to each party, using their classifiers of:

1. Christian Democrats/ Conservatives
2. Social Democrats
3. Liberals
4. Greens
5. Left Socialists

[2] We paid for a general-purpose API access. Costs were less than $100 USD for our total study at the time. More details about the rates can be found: https://builtwith.com/api-credits

[3] As their website states, "BuiltWith technology tracking includes widgets, analytics, frameworks, content management systems, advertisers, content delivery networks, web standards and web servers".

[4] Canada, Greece, and Poland were excluded from the sample due to lack of data. Other parties excluded for lack of data: People's Party for Freedom and Democracy (Netherlands), Coalition of the Radical Left (Greece), New Democracy (Greece), and Brothers of Italy (Italy).

6. Right-wing (populists)
7. Far-right (extreme right)
8. Other

The full list of parties and their ideological family is provided in Appendix 1.

We constructed a new dataset of the embedded infrastructure used on party websites from 2011 to 2021 (McKelvey, 2019; cf. Libert, 2019).

We selected 2011 as our starting year as BuiltWith started tracking most of the parties in our sample after that year. After debating more statistical analysis, we focused on analyzing technologies by days in use on a website and number of party websites using a technology. We relied on BuiltWith's own classification Technology Groups classification (tag) to describe the function of different technology on websites. To make these more intelligible and to build on existing literature we adapted Foot and Schenider's seminal work on early campaign websites. In contrast to their list which detailed the range of interactivity, our coding sought to differentiate between back-end technologies less apparent to users but necessary for websites to function. Accordingly, we developed 6 meta-categories meant to represent broad trends in website development globally. These categories, listed in Table 1, include:

1. *Infrastructural* technologies that provide basic web features from content management systems and web hosting;
2. *Interactive* technologies that enable more dynamic web experiences including javascript libraries associated with web2.0 technologies such as jQuery;
3. *Multimedia* are technologies that display more rich content on websites like videos and maps;
4. *Security* is a proxy for technologies that implement the Secure Sockets Layer (SSL) that encrypts communications between a web server and client;
5. *Sharing* are technologies that allow content to be distributed through social media (through widgets) or feeds; and.
6. *Tracking* are ad and analytics technologies that track users and target ads.

The application of our coding is summarized in Table 1.

Table 1: List of technologies identified within the dataset

ID	BuiltWith Definition[5]	Meta-Category
ads	Advertising	Tracking
analytics	Analytics and Tracking	Tracking
CDN	Content Delivery Network	Infrastructural
cdns	Verified CDN	Infrastructural
cms	Content Management System	Infrastructural
copyright	Copyright	Infrastructural
docinfo	Document Standards	Infrastructural
encoding	Document Encoding	Infrastructural
feeds	Syndication Techniques	Sharing
framework	Frameworks	Infrastructural
hosting	Web Hosting Providers	Infrastructural
javascript	JavaScript Libraries and Functions	Interactive
language	Language	Infrastructural
link	Verified Link	Infrastructural
mapping	Mapping	Multimedia
media	Audio / Video Media	Multimedia
mobile	Mobile	Multimedia

[5] We have used the definitions provided here: https://api.builtwith.com/categoriesV4.xml.

ID	BuiltWith Definition	Meta-Category
mx	Email Hosting Providers	Infrastructural
ns	Name Server	Infrastructural
payment	Payment	Interactive
robots	undefined	Infrastructural
seo_headers	SEO Header Tag	Infrastructural
seo_meta	SEO Meta Tag	Infrastructural
seo_title	SEO Title Tag	Infrastructural
Server	Operating Systems and Servers	Infrastructural
shop	Ecommerce	Interactive
ssl	SSL Certificates	Security
Web Master	Web Master Registration	Infrastructural
Web Server	Web Servers	Infrastructural
widgets	Widgets	Sharing
shipping	Shipping	Infrastructural

This approach meant we identified 31 types of technology as infrastructural, 3 as interactive, 3 as multimedia, 1 as security, 2 as sharing and 2 as tracking. These categories offer some broader trends although we focus on the specific technologies for more granular results when possible.

Findings

RQ1. Are third-party technologies being used on party websites?

To address our first research question, we began by looking at our entire dataset. At the most basic level, we found evidence that parties rely on third-party technologies to deliver their websites. Universally, all party websites used some third-party technologies. Parties averaged 11 technologies on their websites in 2011, a number that increased to 72 in 2021. These numbers grew across all 24 technology categories and across all 66 parties. Our descriptive analysis showed that in 2021, on average, parties used a mixture of technologies, including up to 17 JavaScript libraries, 7 analytics libraries, and 2.5 ad providers. Our data also showed that minor variation amongst parties in terms of the types of third-party technologies used. Put simply, cross-nationally, it appears that parties used the same technology to deliver the same features. Putting this in terms of our 6 categories, across our entire dataset we found most technologies were infrastructural then next were interactive features, sharing, and finally tracking. We found far fewer technologies for multimedia and security.

RQ2. Has usage changed over time?

Our second question looked at trends over time. To answer this question, we looked at longitudinal usage for each specific piece of technology. For each of our 6 types of meta-categories, we observed an increase in use over time, indicating that more party websites are using more third-party technologies. The rates of growth vary per technology (see Figure 2). The table here shows the growth in the number of third-party technologies by meta-categories.

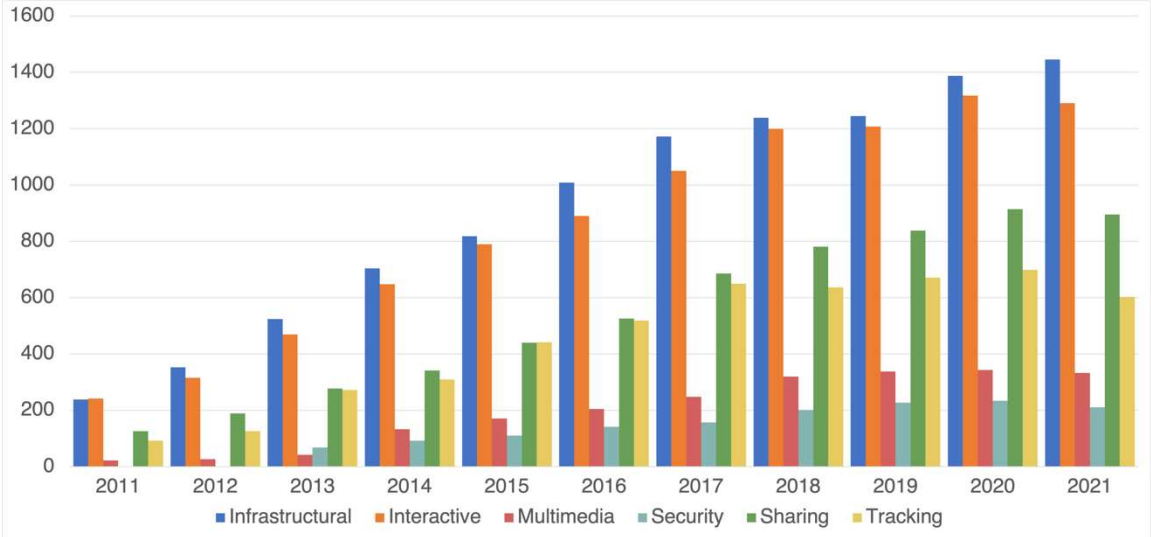

Figure 1: Growth in Tracker Usage by Meta-Category

Political parties over time used more third-party technologies to deliver their websites. All meta-categories grew but interactive and infrastructural technologies experienced the most, suggesting an increase in website complexity. Party websites, in short, needed more third-party technologies to match user expectations (Corrocher, 2011). Figure 1 illustrates a growth in the overall number of trackers in use, showing steady growth in dependency of political websites on third-party technologies. Counting the number of technologies in use, however, does not entirely describe the trends here as even meta-categories with lower growth still have steady usage. Figure 2 illustrates the difference between growth and churn. Parties used technologies on average from 4 years for Multimedia to 2.5 years for Tracking. In some categories, parties used a lot of different technologies. Multimedia and Security technologies, by contrast, involved a few technologies in for longer and less churn. The stability in Security technologies, as we discuss, is part of an important trend toward more secure browsing experiences seen across all websites.

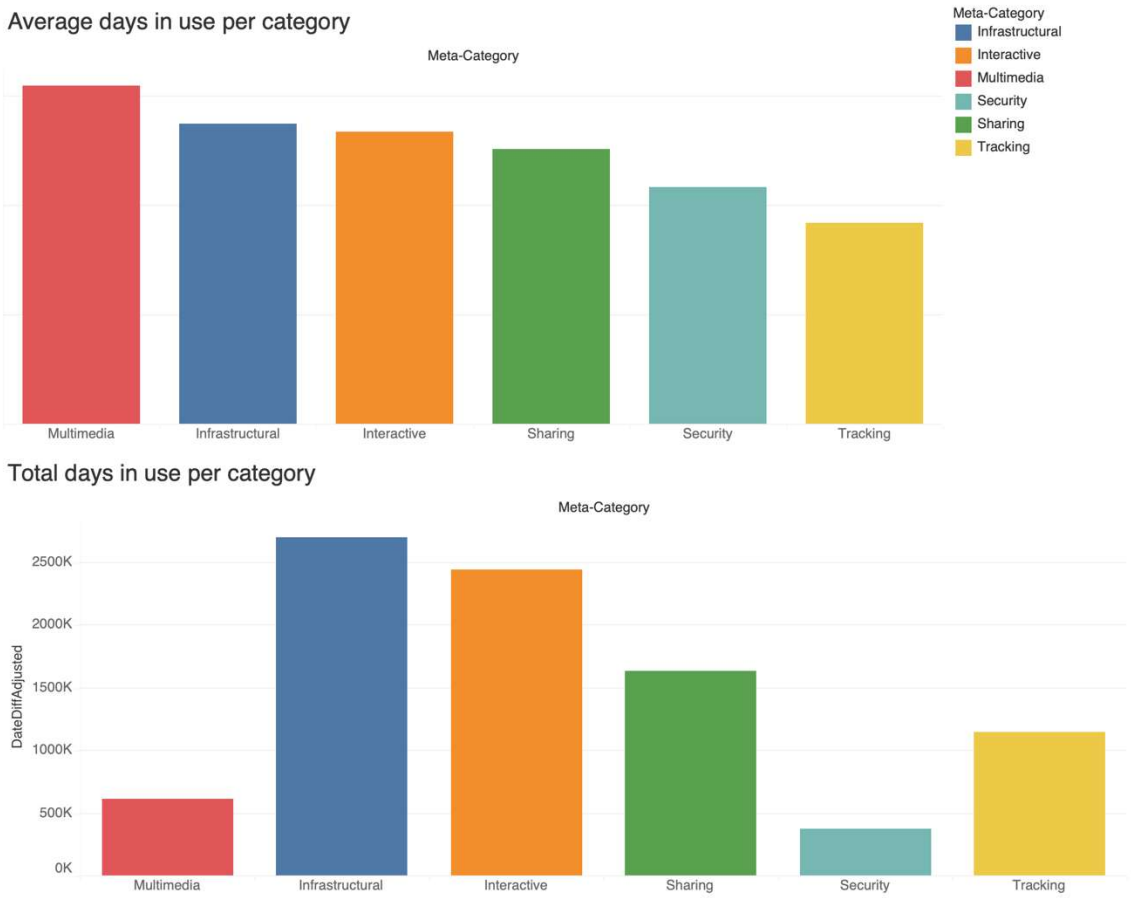

Figure 2: Average days in use per meta-category

These results demonstrate that over the period of study, party websites changed from relying on few to a lot of third-party technologies, pointing to their increasing significance for party websites to operate effectively.

RQ3. What types of technology are in use?

To answer our third research question, we provide an overview of the technologies observed across our selected cases. It was possible to detect a range of different technologies being used by parties internationally. In total, political parties used over 1,340 different technologies with 408 Infrastructural technologies, 313 Interactive

technologies, 263 Sharing technologies, 254 Tracking technologies, 43 Security technologies, and 38 Multimedia technologies as seen in Table 2.

Table 2: Types of Technologies observed on Party Websites

Meta-Category	**Technologies in Use**
Infrastructural	494
Interactive	343
Multimedia	42
Security	44
Sharing	293
Tracking	275

Within these categories, the most prevalent technologies were javascript, widgets, analytics, whilst CDN (Content Distribution Network) technologies followed closely behind.

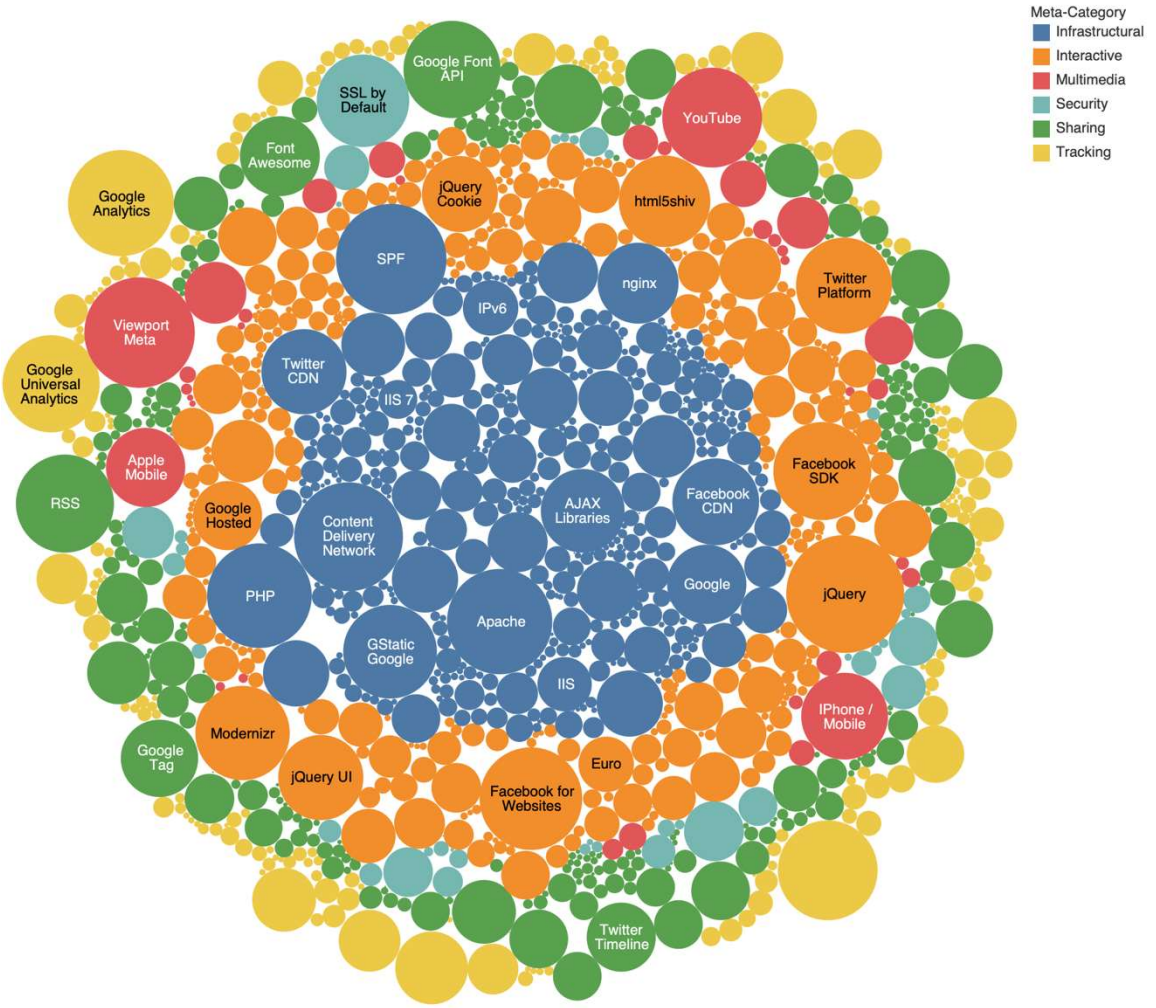

Figure 3: Most used technologies by type

In Figure 3, each circle represents a distinct third-party technology color-coded by category and size varied by overall usage. In interpreting this data, it is useful to know that small dots are third party technologies that were used for only a short period of time before being retired, whereas large dots signal technologies that have been used for a longer period of time. Comparing across categories, we can start to see differences in the number of longstanding third-party providers. A few technologies have been labeled to demonstrate the differences in technologies encountered. Google Analytics is the first

piece of technology worth pointing out as it is a clear stand-out in terms of analytics technologies evident on the websites.

Party websites use a diverse range of third-party web libraries. By far the most websites use JavaScript technologies that enable interactive websites commonly associated with the advent of web2.0. The library jQuery[6], released in 2006, is the most popular Interactive technology and used in different versions by most parties. The uptake suggests that party websites follow web trends by integrating JavaScript to offer more dynamic, less static hypertext experiences.

There are lots of third-party technologies used for only short periods of time alongside more established technologies, suggesting the presence of new entrants who failed to secure long-term adoption or who were purchased (and absorbed) by larger providers. Tracking technologies, displayed in yellow, illustrates a similar trend, with a few big stable players, like Google and Meta, and lots of little players used for shorter periods of time. Looking in more detail here, we can see some small firms like DemDex and Omniture SiteCatalyst being acquired by larger firms, in this case Adobe. Similar developments occurred to Datalogix and BlueKai DMP, who were acquired by Oracle. The limited longevity of many smaller firms is therefore explained both by a failure to embed their solutions, and by mergers and acquisitions. The same finding applies for JavaScript, depicted in teal, with a few big players and lots of little ones.

RQ4. Does ideology or country impact usage?

To investigate our fourth research question, we sorted our data using the ideological family labels provided by the Political Party Database Project. As outlined above, we investigated the patterns of technology adoption across the eight types of party they identify. Adopting this approach, we found that party families do not seem to influence technology adoption significantly with little deviation (St.Dev in 3.175036339 in 2011; St. Dev 10.4628587) between party families. Even for ad trackers and analytics technologies, there is no clear pattern distinguishing parties. Data visualized in Figure 6 illustrates technologies in use by country. Google Analytics and jQuery are the most

[6] While we have decided to point out jQuery in figure 3 as it is a well-known technology, it is important to recognize that the size of jQuery should likely be bigger relative to the other technologies as it has a number of versions.

popular by party and by country. We see a lot of technologies, used only for a short amount of time at the bottom right of each graph. There is a long tail effect, with lots of experimentation but there are few clear winners.

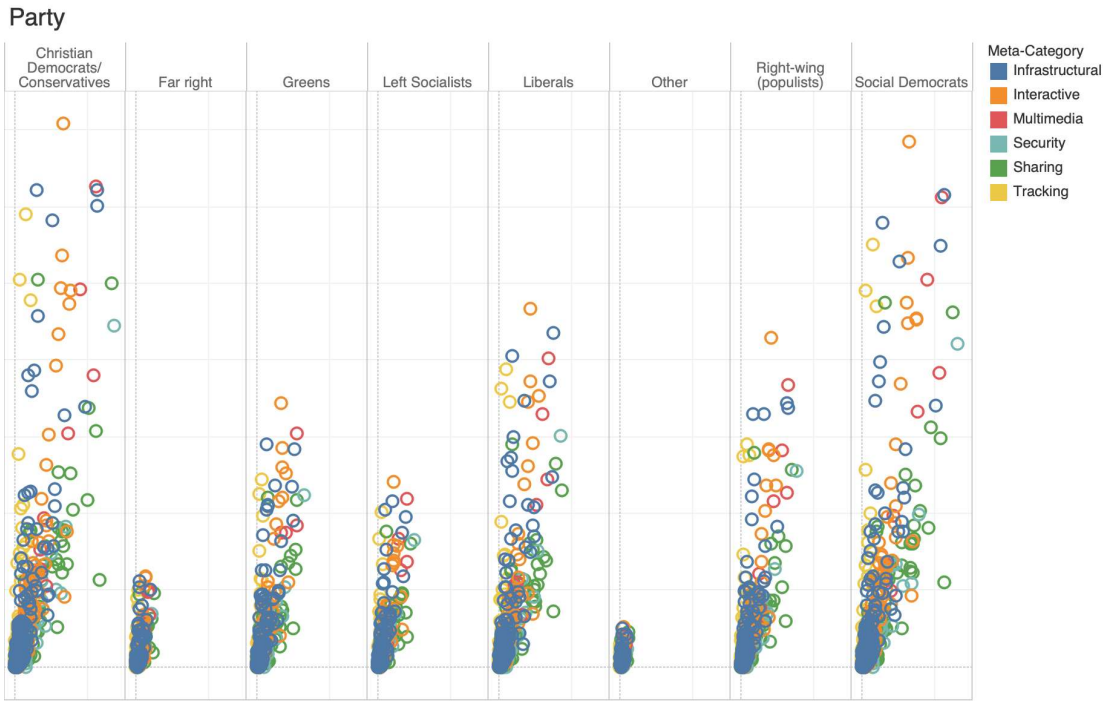

Figure 4: Technology usage by party family. Unique technology ID (TID) on the horizontal axis and Days in Use. Color refers to Meta-Category. The clustering in the lower left quadrant indicates many technologies used infrequently.

When the different party families are compared – see Figure 4 – some notable findings are evident. First, Social Democrat and Christian-Democrat/Conservative parties have similar technology use. These are the traditional major parties - centre-right and centre-left - in many advanced democracies with significant literature arguing that as new technology becomes an established feature of electoral competition that it normalises party competition (Gibson and McAllister, 2014). In other words, rather than opening up opportunities for new players to break through, instead the trend reinforces existing disparities, especially around resources. Second, the technology usage of other party

families that have been historically less influential or successful, such as the Far Right or Right-wing Populists look different to the Social Democratic and Christian Democratic/Conservative parties. However, these parties have been increasingly successful over the last twenty years and if the normalization thesis was to hold, the expectation would be that they would start to look like the parties discussed above in terms of the use of technology. There is, of course, an argument that could be made that due to ideology parties such as these - and perhaps the Green parties - are unlikely to follow this trajectory, but this remains an open question.

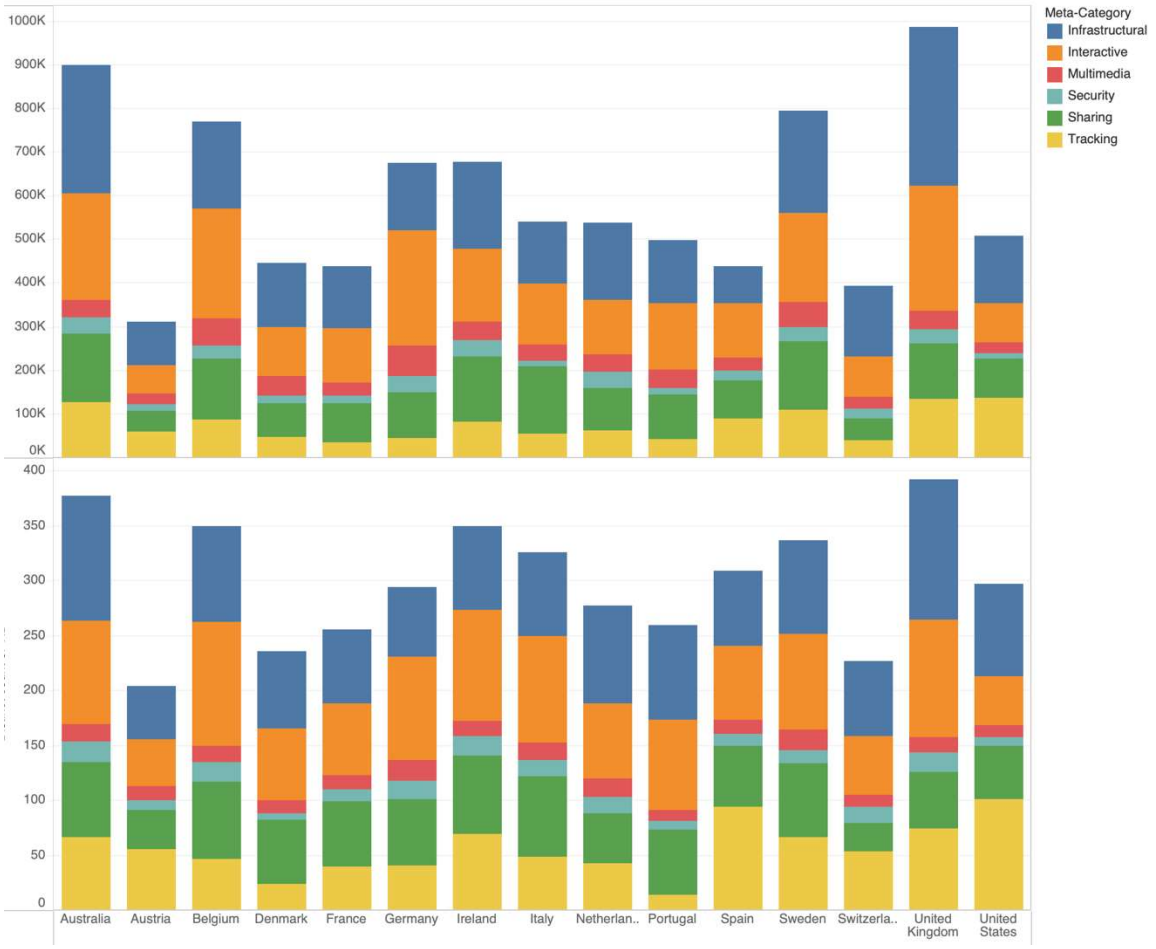

Figure 5: Technologies usage by country in terms of days in use (upper) and technologies in use (lower). Unique technology ID (TID) on the horizontal axis and Days in Use. Color refers to Meta-Category type.

When practices in different countries are compared in Figure 5, we see a marked difference between larger and smaller countries with larger countries using more technologies. Notably, Tracking technologies (Yellow) are in use more in non-EU countries especially the United States and Australia with more irregular political data laws. These differences are modest but demonstrates how our approach could measure the impact of privacy law changes by looking, for example, at the impact of Brexit on UK website privacy policies.

RQ5. Who are the providers of these technologies and are there signs of platformization?

To address our final question, we focused on the idea of platformization, and specifically the degree to which a specific firm dominates or has become integral to website infrastructure. We truncated third-party technology names and looked for common prefixes. Doing so, we identified numerous technologies linked to jQuery, Google, Wordpress, Facebook, Amazon, Twitter, and Cloudflare. We then reviewed the truncations to try and match technologies with their owners.

Looking first at the degree to which certain third-party technologies dominate within these categories, Most are owned by Google, with DoubleClick.Net and Google Analytics present on 92 per cent of party websites, and YouTube on 91 per cent of party websites. Google Analytics is Google's free service offering website administrators a dashboard to analyze their traffic. Google may collect data from this service if the user approves. Google acquired DoubleClick in 2008, merging the online advertising firm into the search engine's advertising business. YouTube, finally, demonstrates the growing connection of party websites to social media and the particular turn toward YouTube as a campaigning tool. Whereas Google enables key website functions such as analytics, Meta's technologies enable data flows between websites and its social media services (e.g. Facebook and Instagram). These third-party technologies, specifically its Pixel program, have been controversial for tracking users across websites. These findings match our observation above about the overall influence of Google and Meta in the technologies used.

The results illustrate that Google, Meta, and Amazon manage the most technologies used in our dataset and the most used technologies in our dataset. Figure 6 illustrates the top 25 owners with the most technologies in use over time. We truncated the list, but it observes a long tail effect with platforms controlling most technologies then many smaller technologies.

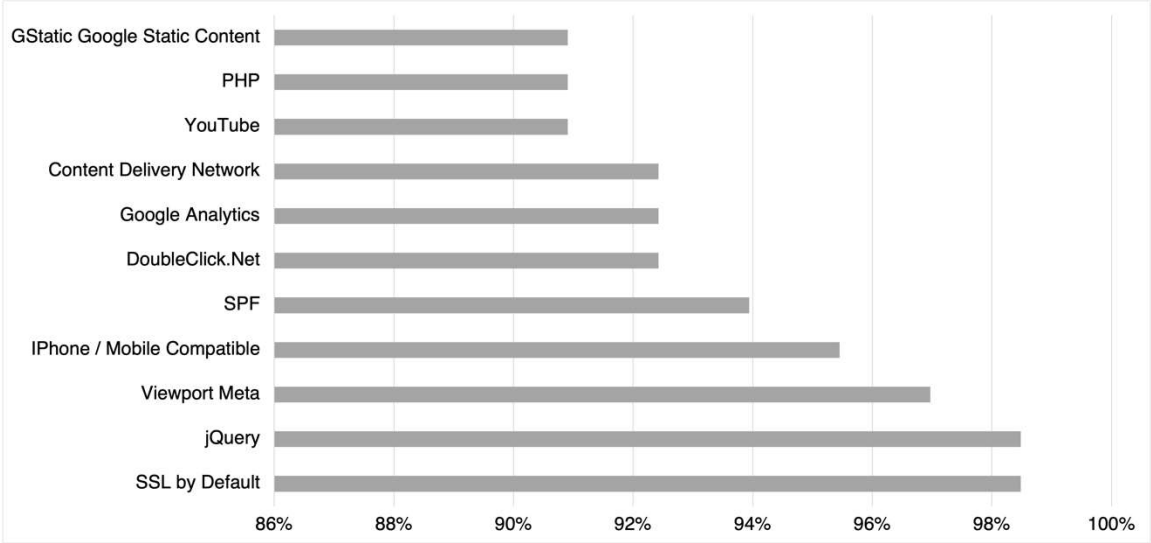

Figure 6: Top 25 owners of technologies in use

The same can be found for technologies in use for the most time (or days in use). In Figure 7, we use a pie chart to simplify the significance, but, again Google, Facebook (now Meta) and Twitter (now X) own the most used technologies in the data.

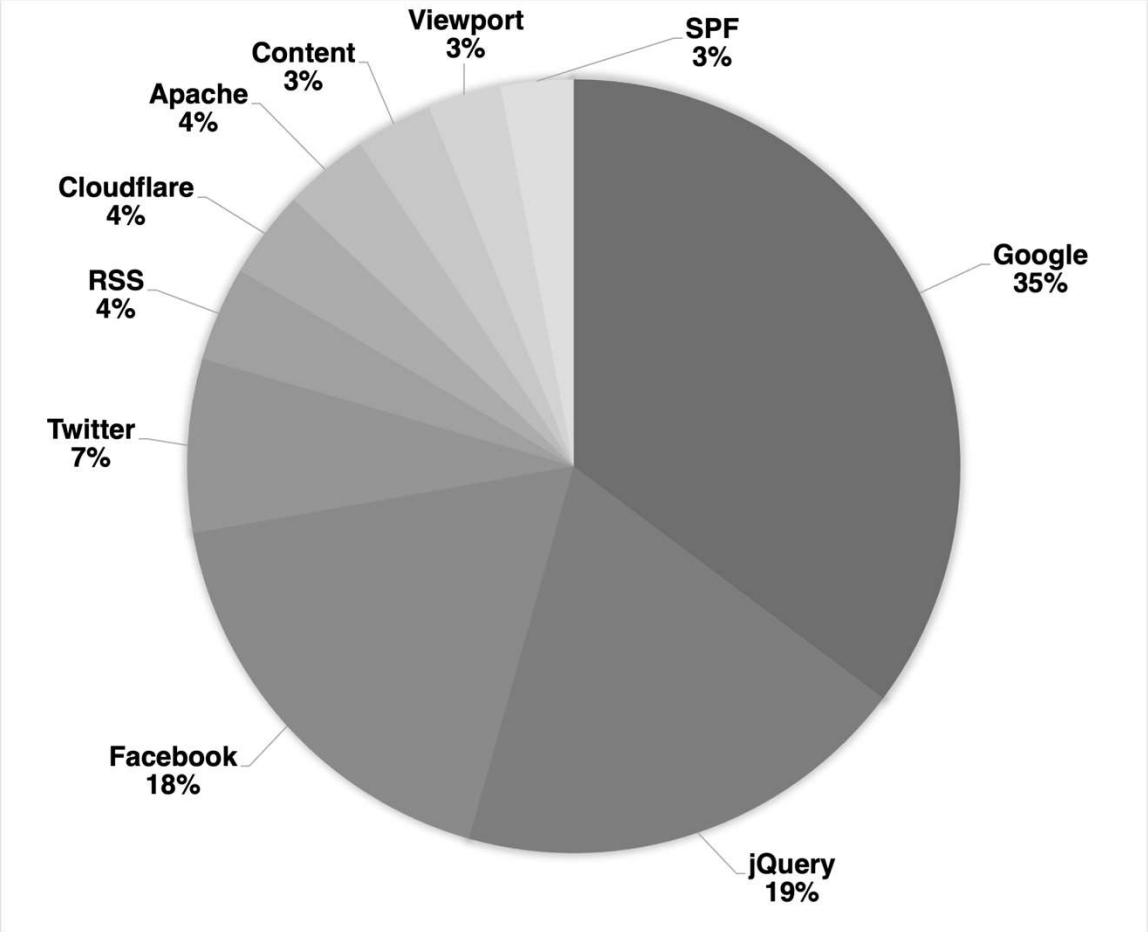

Figure 7: Top 10 owners of technologies in use the longest

The findings are clear. A few platforms, specifically Google and Meta, provide critical infrastructure for parties no matter the country nor the party family. As seen above, there is a general trend toward platformization.

To further consider the dynamics of platformization in greater detail, we look specifically at trends in analytics and advertising technologies as one informative example. In doing so, we can see how the dominance of certain companies - in this instance Meta and Google - is often the result of the demise of competitor companies, and the proliferation of tools being offered by these single providers (either through their

demise or acquisition by other providers). The effects of platformization can be best found in the Tracking meta-category in Figure 8.

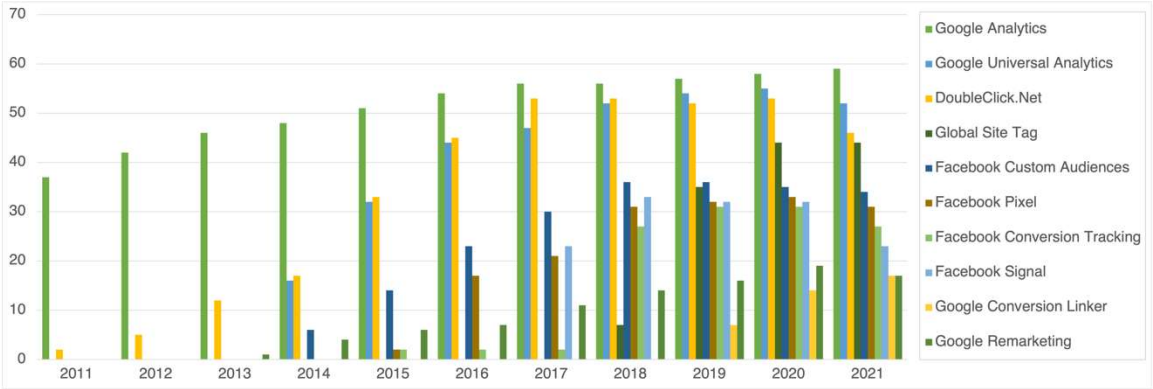

Figure 8: Tracking Technologies in Use.

Most parties depend on Google and Meta to deliver their website. Our findings match Blanke and Pybus's conclusion that "the largest platforms dominate here, because they provide the key services for everybody else" (2020, p. 11). What we find further is that these platforms dominate in managing analytics, data not just infrastructural features.

To illustrate this trend, we present an example that compares the advertising and analytics technologies being used on the UK Labour Party's website. We do so as it is as a case where we have prior research into digital campaigning and which we suggest is likely to be representative of the non-US parties covered as it has a well-documented history of engaging in digital campaigning and is still subject to regulatory regimes that prescribe and limit the types of practices the parties can engage in (Dommett et al.,2024).

At the start of 2015, the United Kingdom was in the midst of a general election that was associated with parties' use of data (Anstead, 2017), and widespread use of party websites and social media (Southern and Lee, 2019). Despite these trends, looking at the advertising and analytics technologies on the party's websites, we can identify only 3 ad providers and 6 analytic providers. By the 2019 general election the party had 12 ad providers and 24 analytics providers.

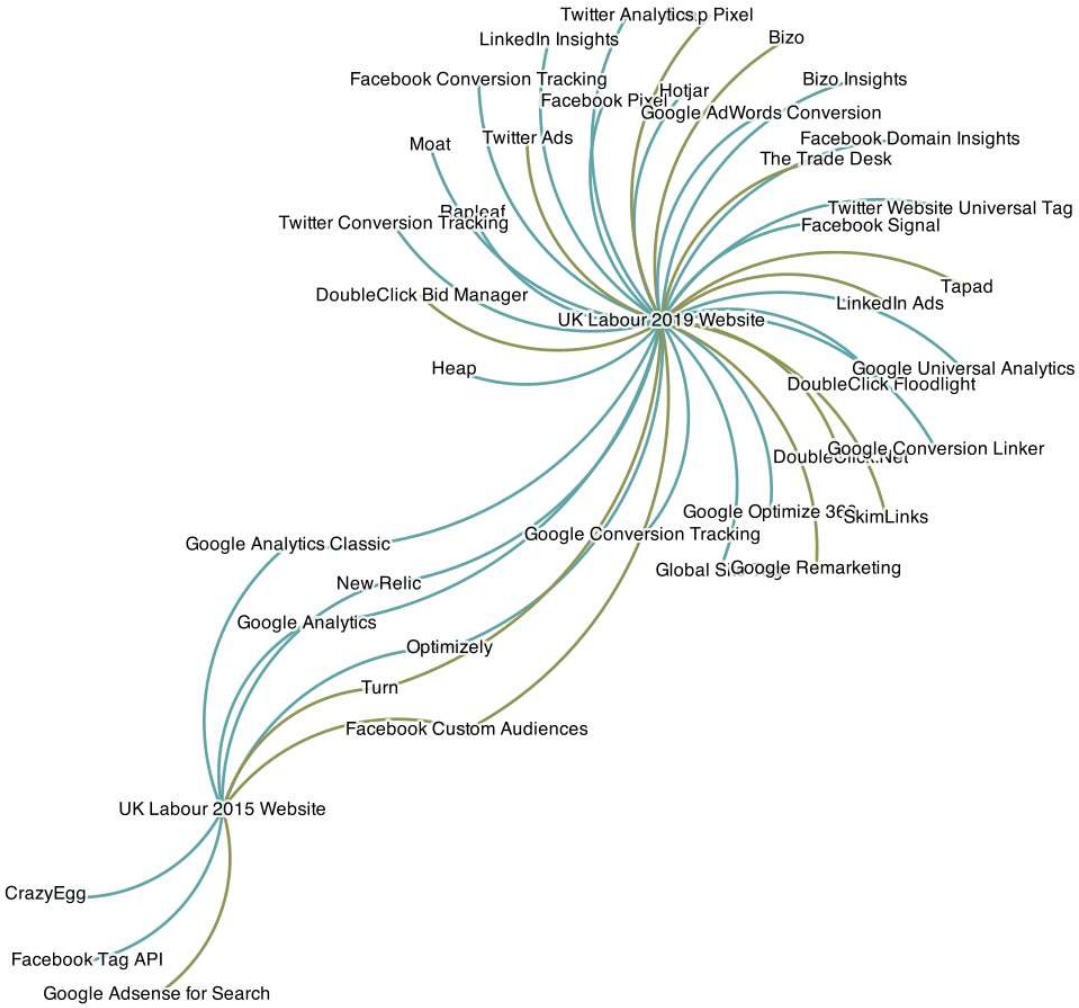

Figure 9: Changes in the Labour Party Website Advertising and Analytics Technology Use between 2015 to 2019

Figure 9 depicts these changes, noticeably demonstrating the staying power of certain companies, and the decline of smaller alternatives. In 2015, the Labour Party relied on, for example, CrazyEgg, presumably to provide a heatmap of web activity. By

2019, CrazyEgg is gone. Google and Facebook provided third-party utilities, especially Google Analytics. By 2019, the Labour Party used more third-party trackers but mostly trackers provided by Google for ad services. The graph, importantly, should be read as a fragment not a map. Where data flows from these websites to what parts of the large platforms are hidden. At the very least, Figure 7 shows that two years after the Cambridge Analytica scandal, the Labour Party had expanded its use of third-party trackers but was reliant on a small number of companies - namely Meta and Google - as providers of these services. Whilst just one example, this indicates how the dominance and proliferation of services coming from certain companies has led to the dominance of certain companies.

Discussion

In this paper we set out to investigate the dynamics of party websites, exploring in detail how technologies have been adopted in different parties and over time. Posing five questions, we sought to offer a descriptive overview of key trends to facilitate further analysis of this essential and yet, in recent times, often overlooked technology. We explore trends in relation to 6 types of technology, classifying practices in relation to infrastructural, interactive, multimedia, security, sharing and tracking technologies. In answer to our questions, we have found evidence that party websites remain a key part of party infrastructure and a site of investment and change. We have shown that parties are increasingly adopting third-party technologies on their websites. Exploring variation in practice, we investigated the degree to which ideology and country affected the third-party technology in use. We found that ideology - using party family as a proxy – and nationally do impact use, with bigger countries and more dominant parties more prone to use third-party technology, an indication of party professionalization and technological capacity.

Most significantly, findings provide international evidence of platformization on party websites. Political websites, simply put, could not exist without the support of Google and Meta to a lesser extent. Reviewing our data, we found that a small number of companies were providing almost all our parties with the same product, and that certain

companies were providing a raft of products. We showed that Google, and Meta produce libraries necessary for key functionality of party websites. Much like in the broader app ecosystem, there is a decided influence on platform firms as critical infrastructure providers. Parties could shift to other paid technologies, but the dominance of Google Analytics, in its many forms, illustrates the influence of a free-to-use business model that locks-in clients and situates political parties as just another node in a growing network of data ingested by these large platforms.

Beyond our primary research questions, we also found two trends that warrant further investigation. The first of these relates to securitization. There is a growing intersection between cybersecurity and political parties. We find that there is preliminary evidence to suggest that parties are adopting better cybersecurity practices as seen in the Security meta-category. For example, Secure Sockets Layer (SSL) is the most used third-party technology. It enables websites to send encrypted data and therefore works to promote web security. The trend is unremarkable as it matches a global turn to SSL (Felt et al., 2017). SSL secures data from middleman or network inspection, so the tool does not imply more secure party data practices, but rather better security of data being collected and to website visitors. Some adoption may be related to GDPR expectations as web businesses turn to encryption technologies to ensure compliance during data handling (Callan, 2018).

The findings also add to the turn toward political marketing as a theory of political communication. Political party websites behave like other websites. Indeed, political technologies matter less than platformization. Findings complicate past studies of the flows of political technologies, e.g. from campaigns to start-ups in the United States (Kreiss & Jasinski, 2016). While, as we discuss in the conclusion, there might be data limitations, the key finding is that political-specific technologies appear limited to websites themselves with commercial applications more prominent. Parties, in short, can rely on general-purpose technologies when possible except in their data management, as we know from other studies, all to suggest that future studies need to acknowledge the limitations of the political software industry and the overall influence of marketing and commercial data analytics in the field.

Free Software

In contrast to American-centric political communication research where there is a robust political industry (cf. Kreiss & Jasinski, 2016), we find that parties routinely utilise open-source and free software tools (or FLOSS for short). In short, free software and open-source technologies do matter, indicating how this third way of software production has a major influence on party websites. Most websites depend on Wordpress, an open-source content management system, and jQuery, another free JavaScript tool for dynamic interfaces. Wordpress and another open-source content management system in their many versions clearly outpace American political technology provider NationBuilder in use in Australia, France, New Zealand, and the United Kingdom whereas Wordpress and Drupal to a lesser extent appear across the sample.

By contrast, there is a lack of expressly political technologies being used on party websites. Aside from NationBuilder, discussed above, other major political technologies are often not adopted on party websites. BuiltWith does track well known technologies such as ActBlue, NGPVAN, or ActionKit, but these technologies do not appear in the sample. Other than NationBuilder we find limited prominence of expressly political technology firms. The results suggest that political technologies have not largely developed for voter experiences on party websites and that, instead, parties seem to follow broader trends of platformization and political marketing to source their technologies.

These findings demonstrate that studies of the political economy of software and the political technology field are much larger than either platform solutions or political technology solutions. The influence of Meta and Google cannot be overstated, but at the same time there is a need to understand the politics of software development and the afterlife of early efforts to integrate FLOSS into political campaigns (McKelvey, 2011).

Conclusion

The party website is a novel and important site of comparative research into the digitization of party politics. Parties increasingly rely on third-party technologies to deliver their website. These technologies, somewhat paradoxically, help parties secure

data while also entering them into dense networks of data sharing. The findings presented here suggest that democratic politics and the key institutions which it consists of are becoming just one extra component in the larger platformization of the Internet. Just like most other sectors, the influence of Google and Meta is playing an outsized role on digital communication. So far, the bargain seems to be that Google maintains some access or oversight into the data its analytics services help parties analyze, while Meta's role is less pronounced. How long this relationship can continue before platforms have a greater influence on parties' digital infrastructure remains an open question.

These findings raise interesting questions for those interested in parties' digital adaptation and citizens' experience of democratic politics. Unlike previous research which has shown that party-level attributes such as ideology can have a material effect on party practices, our findings reveal that ideology does not result in alternative adoption practices. Whilst our research did find some evidence of certain parties adopting what could be deemed more 'ethical' tools which rely on open-source foundations, or that profess non-extractive values, we found that a party's ideological foundation did not affect its adoption of different technologies. This points to the potential power of platformization in prompting convergence in practice. It was, however, notable that we did find some differences in practice, with variations evident in practice when comparing US and European parties. From this perspective regulation appears to exert a mediating effect on technological adoption, suggesting that platforms' power is not unfettered. Our findings provide a first analysis of possible drivers of adoption practices and further analysis is needed to explore the degree to which platformization is mitigated by other factors not examined here.

Our study remains a proof of concept about how a commercial data source can be repurposed for academic research. Our use of the BuiltWith data remains preliminary and largely descriptive. We did consider a statistical approach, but the number of variables meant this approach did not seem feasible. The deeper limitation is that we are replicating the political marketing bias by using a marketing tool to analyze politics. A dedicated political observatory may provide richer findings, but this brings its own challenges,

namely resourcing. Clearly, research could be expanded to include a bigger international focus or have a sub-national focus. We do not know data availability for websites outside our case studies, but we suspect the number of cases could be expanded. The risk, like in the case of Canada in our sample, is the data might not be usable. The other option is to go deeper and use the data set as trace data for interviews and detailed case studies. Our example of the UK Labour Party above demonstrates the possibility of telling rich stories about the design and consequences of the election strategies of parties.

Appendix 1: Political Parties in the Sample

Party Name	Country	Party Family
Liberal Party of Australia	Australia	Christian Democrats/Conservatives
Australian Labor Party	Australia	Social Democrats
National Party	Australia	Christian Democrats/Conservatives
Pauline Hanson's One Nation	Australia	Right-wing (populists)
The Greens	Australia	Greens
The Greens	Austria	Greens
Freedom Party	Austria	Right-wing (populists)
People's Party	Austria	Christian Democrats/Conservatives
Christian-Democrat and Flemish	Belgium	Christian Democrats/Conservatives
Reform Movement	Belgium	Liberals
Socialist Party	Belgium	Social Democrats
Vlaams Belang	Belgium	Right-wing (populists)
New Flemish Alliance	Belgium	Liberals
Social Democrats	Denmark	Social Democrats
Socialist People's Party	Denmark	Greens
Danish People's Party	Denmark	Right-wing (populists)
Liberals	Denmark	Liberals
Socialist Party	France	Social Democrats
Republicans	France	Christian Democrats/Conservatives
En Marche!	France	Liberals

Christian Social Union	Germany	Christian Democrats/Conservatives
Alliance '90/The Greens	Germany	Greens
Social Democratic Party	Germany	Social Democrats
The Left	Germany	Left Socialists
Christian Democratic Union	Germany	Christian Democrats/Conservatives
Alternative für Deutschland	Germany	Right-wing (populists)
Sinn Fein	Ireland	Left Socialists
Labour Party	Ireland	Social Democrats
Fine Gael	Ireland	Christian Democrats/Conservatives
Green Party	Ireland	Greens
Fianna Fail	Ireland	Liberals
Northern League	Italy	Far right
Democratic Party	Italy	Social Democrats
Forza Italia	Italy	Christian Democrats/Conservatives
Five Star Movement	Italy	Other
Party for Freedom	Netherlands	Right-wing (populists)
Democrats 66	Netherlands	Liberals
Labour Party	Netherlands	Social Democrats
Christian Democratic Appeal	Netherlands	Christian Democrats/Conservatives
Left Bloc	Portugal	Left Socialists
Socialist Party	Portugal	Social Democrats
Social Democratic Party	Portugal	Christian Democrats/Conservatives
Communist Party	Portugal	Left Socialists

People's Party	Spain	Christian Democrats/Conservatives
PSOE	Spain	Social Democrats
Vox	Spain	Right-wing (populists)
Centre Party	Sweden	Liberals
Social Democrats	Sweden	Social Democrats
Sweden Democrats	Sweden	Far Right
Left Party	Sweden	Left Socialists
Moderate Party	Sweden	Christian Democrats/Conservatives
Green Party	United Kingdom	Greens
Conservative Party	United Kingdom	Christian Democrats/Conservatives
Scottish National Party	United Kingdom	Social Democrats
Liberal Democrats	United Kingdom	Liberals
Labour Party	United Kingdom	Social Democrats
The Democratic Party	United States	Liberals
The Republican Party	United States	Christian Democrats/Conservatives
Labour Party	New Zealand	Social Democrats
National Party	New Zealand	Christian Democrats/Conservatives
Greens	New Zealand	Greens

ACT	New Zealand	Liberals
Swiss People's Party	Switzerland	Right-wing (populists)
Social Democratic Party	Switzerland	Social Democrats
FDP The Liberals	Switzerland	Liberals
The Centre	Switzerland	Christian Democrats/Conservatives

References

Alperstein, N. (2021). *Performing Media Activism in the Digital Age*. Springer Nature.

Anstead, N. (2017). Data-Driven Campaigning in the 2015 United Kingdom General Election. *The International Journal of Press/Politics*, *22*(3), 294-313. https://doi.org/10.1177/1940161217706163

Barberà, O., Sandri, G., Correa, P., & Rodríguez-Teruel, J. (2021). Political parties transition into the digital era. *Digital Parties: The Challenges of Online Organisation and Participation*, 1-22.

Blanke, T., & Pybus, J. (2020) 'The Material Conditions of Platforms: Monopolization Through Decentralization', *Social Media + Society,* 6(4). https://doi.org/10.1177/2056305120971632.

Bounegru, L., Gray, J., Venturini, T., et al. (eds) (2018) Using tracker signatures to map the techno-commercial underpinnings of fake news sites. In: Bounegru L, Gray J, Venturini T, et al. (eds) *A Field Guide to "Fake News" and Other Information Disorders.* Amsterdam: Public Data Lab, pp. 1–216. Available at: http://fakenews.publicdatalab.org/

Callan, T. (2018, April 26). How Does SSL Fit into GDPR? *geocertsSSL*. https://www.geocerts.com/blog/how-does-ssl-fit-into-gdpr

Coleman, S. (2001). Online campaigning, *Parliamentary Affairs*, 54(4), 679-688.

Crain, M. (2021). *Profit over privacy: How surveillance advertising conquered the Internet*. University of Minnesota Press.

Davis R (2009) *Typing Politics: The Role of Blogs in American Politics*. Oxford: Oxford University Press.

Dommett, K. (2021) 'The inter-institutional impact of digital platform companies on democracy: A case study of the UK media's digital campaigning coverage', *New Media and Society.*

Dommett, K., Kefford, G., & Power, S. (2021). The digital ecosystem: The new politics of party organization in parliamentary democracies. *Party Politics*, *27*(5), 847–857.

Dommett, K., Kefford, G., & Krushinski, S. (2024) *Data-Driven Campaigning and Political Parties*, Oxford: Oxford University Press.

Dommett, K., & Rye, D. (2018). Taking up the baton? New campaigning organisations and the enactment of representative functions. *Politics,* 38(4), 411-427.

Dommett, K., & Power, S. (2021). Studying digital parties: Methods, challenges and responses. *Digital Parties: The Challenges of Online Organisation and Participation*, 67-83.

Farrell, D. M., Kolodny, R., & Medvic, S. (2001). Parties and Campaign Professionals in a Digital Age: Political Consultants in the United States and Their Counterparts Overseas. *Harvard International Journal of Press/Politics*, *6*(4), 11–30.

Felt, A. P., Barnes, R., King, A., Palmer, C., Bentzel, C., & Tabriz, P. (2017, August 16). Measuring HTTPS Adoption on the Web. *26th USENIX Security Symposium, Vancouver.*

Foot, K., & Schneider, S. M. (2006). *Web campaigning (acting with technology).* The MIT Press.

Gibson, R. K., & McAllister, I. (2015). Normalising or Equalising Party Competition? Assessing the Impact of the Web on Election Campaigning. Political Studies, 63(3), 529–547. https://doi.org/10.1111/1467-9248.12107

Gibson, R. (2020). *When the Nerds Go Marching In: How Digital Technology Moved*

from the Margins to the Mainstream of Political Campaigns. Oxford University Press.

Gibson R., Margolis M., Resnick D., et al. (2003) 'Election campaigning on the WWW in the USA and UK: A comparative analysis'. *Party Politics* 9(1): 47–75.

Gibson, R., & Ward, S. (2009). Parties in the digital age—A review article. *Representation*, *45*(1), 87-100.

Gillespie, T. (2018) Custodians of the Internet: Platforms, Content Moderation, and the Hidden Decisions That Shape Social Media, Yale University Press

Helmond, A. (2015). The platformization of the web: Making web data platform ready. *Social media+ society*, *1*(2), 2056305115603080.

Hooghe, M., & Vissers, S. (2009). Reaching out or reaching in? The use of party websites during the 2006 electoral campaign in Belgium. *Information, Communication & Society*, *12*(5), 691-714.

Ignazi, P. (2020). The four knights of intra-party democracy: A rescue for party delegitimation. *Party Politics*, 26(1), 9–20. https://doi.org/10.1177/1354068818754599

Jackson N (2003) 'MPs and web technologies: An untapped opportunity?', *Journal of Public Affairs* 3(2): 124–137.

Jackson N, Lilleker D (2011) Microblogging, constituency service and impression management: UK MPs and use of Twitter. *The Journal of Legislative Studies* 17(1): 86–105.

Karpf, David. (2012) "Social Science Research Methods in Internet Time." Information, Communication & Society 15, no. 5): 639–61. https://doi.org/10.1080/1369118X.2012.665468.

Kefford, G. (2021). *Political parties and campaigning in Australia: Data, Digital and Field*. Cham: Palgrave.

Kefford, G., Dommett, K., Baldwin-Philippi, J., Bannerman, S., Dobber, T., Kruschinski, S., Kruikemeir & Rzepecki, E. (2023). Data-driven campaigning and democratic disruption: Evidence from six advanced democracies. *Party Politics*, *29*(3), 448-462.

Kruikemeier, S., Aparaschivei, A. P., Boomgaarden, H. G., Van Noort, G., & Vliegenthart, R. (2015). Party and Candidate Websites: A Comparative Explanatory Analysis. *Mass Communication and Society*, 18(6), 821–850. https://doi.org/10.1080/15205436.2015.1051233.

Kreiss, D. (2016). *Prototype politics: Technology-intensive campaigning and the data of democracy*. Oxford university press.

Kreiss, D., & Jasinski, C. (2016) 'The Tech Industry Meets Presidential Politics: Explaining the Democratic Party's Technological Advantage in Electoral Campaigning, 2004–2012', *Political Communication*, 1–19. https://doi.org/10.1080/10584609.2015.1121941

Libert, T. (2015). Exposing the Invisible Web: An Analysis of Third-Party HTTP Requests on 1 Million Websites. International Journal of Communication, 9(2015), 3544–3561.

Lilleker DG, Koc-Michalska K, Schweitzer EJ (2011) 'Informing, engaging, mobilizing, or interacting: Searching for a European model of web campaigning', *European Journal of Communication* 26(3): 195–213.

Magin, M., Podschuweit, N., Haßler, J., & Russmann, U. (2017). Campaigning in the fourth age of political communication. A multi-method study on the use of Facebook by German and Austrian parties in the 2013 national election

campaigns. *Information, communication & society*, *20*(11), 1698-1719.

Margetts, H. (2006). *Cyber parties*. SAGE Publications Ltd, https://doi.org/10.4135/9781848608047

McKelvey, F. (2011). A Programmable Platform? Drupal, Modularity, and the Future of the Web. Fibreculture, 18, 232–254.

McKelvey, F. (2019). Cranks, clickbait and cons: On the acceptable use of political engagement platforms. *Internet Policy Review*, 8(4).

McKelvey, F. (2018). Hillary 2016. In J. W. Morris & S. Murray (Eds.), *Appified: Mundane Software and the Rise of the Apps* (pp. 246–256). University of Michigan Press.

McKelvey, F., & Piebiak, J. (2018). Porting the political campaign: The NationBuilder platform and the global flows of political technology. *New Media & Society*, 20(3), 901–918. https://doi.org/10.1177/1461444816675439

Nielsen, R. (2012) *Ground Wars: Personalized Communication in Political Campaigns*, Princeton: Princeton University Press.

Nielsen, R. and Ganter, S.A. (2022) *The Power of Platforms*, Oxford: OUP.

Norris, P. (2001). *Digital divide: Civic engagement, information poverty, and the Internet worldwide*. Cambridge university press.

Norris, P. (2003). Preaching to the converted? Pluralism, participation and party websites. *Party politics*, *9*(1), 21-45.

Plantin, J.-C., Lagoze, C., Edwards, P. N., & Sandvig, C. (2018). Infrastructure studies meet platform studies in the age of Google and Facebook. *New Media & Society*, *20*(1), 293-310.

Poell, T., Nieborg, D., & Dijck, J. van. (2019). Platformisation. *Internet Policy Review*, 8(4). https://policyreview.info/concepts/platformisation.

Poguntke, T., Scarrow, S. Webb, P. (2017) "Political Party Database Version 1a.3 (2017 Update)", https://doi.org/10.7910/DVN/LCZTAN, Harvard Dataverse, V1, UNF:6:J8/xsmsdSoDwAQLC6t2zew==

José van Dijck, Thomas Poell, and Martijn de Waal (2018) *The Platform Society: Public Values in a Connective World,* Oxford: Oxford University Press.

Römmele, A. (2003). Political parties, party communication and new information and communication technologies. *Party Politics*, *9*(1), 7-20.

Römmele, A. and Gibson, R. (2020). Scientific and Subversive: the Two Faces of the 4th Phase of Political Campaigning. *New Media and Society*, *22*(4), 595-610.

Russmann, U. (2010). Parties and Candidates on the Web–A Cross-national Comparison of Party and Candidate Website Communication in the 2008 Austrian and 2009 German National Elections.

Schweitzer, E. J. (2005). Election campaigning online: German party websites in the 2002 national elections. *European Journal of Communication*, *20*(3), 327-351.

Southern, R. & Lee, B (2019) Politics as usual? Assessing the extent and content of candidate-level online campaigning at the 2015 UK general election, Journal of Elections, Public Opinion and Parties, 29:2, 179-198, DOI: 10.1080/17457289.2018.1515209

Strandberg, K. (2009). Online campaigning: an opening for the outsiders? An analysis of Finnish parliamentary candidates' websites in the 2003 election campaign. *New Media & Society*, *11*(5), 835-854.

Toode, Ü. (2016). Fostering Dialogue or Monologue? Estonian Party Websites During the 2009 European Parliament Elections. *Journal of Political Marketing*, *15*(2-3), 120-148.

Tromble R (2016) 'Thanks for (actually) responding!' How citizen demand shapes politicians' interactive engagement on Twitter. *New Media and Society* 20(2): 676–697.

Vaccari, C. (2010). "Technology is a commodity": The Internet in the 2008 United States presidential election. *Journal of information technology & politics*, *7*(4), 318-339.

Vaccari C (2014) You've got (no) mail: How parties and candidates respond to e-mail inquiries in Western democracies. *Journal of Informational Technology and Politics* 11(2): 245–258.

Van Dijck, J., Poell, T., & De Waal, M. (2018). *The platform society: Public values in a connective world*. Oxford University Press.