Platform Bypass:
Adaptation Through Informal Collaboration in the Danish News Ecosystem

Emil Bakkensen Johansen
Strategic Organization Design
Department of Business and Management

Oliver Baumann
Strategic Organization Design
Department of Business and Management

Abstract: Collaboration within ecosystems is often formally orchestrated by a central platform. While these interactions are well-documented, the dynamics of ecosystem adaptation when the platform fails to uphold the collaborative structure remain underexplored. In this paper, we propose the concept of "platform bypass" – an adaptive response whereby ecosystem participants engage in direct, informal collaboration, effectively sidestepping the central firm. We study this phenomenon within the Danish news ecosystem, leveraging a dataset comprising 5.2 million news articles from 2005 to 2021. Specifically, we exploit the crisis faced by the central news agency between 2008 and 2015. Our findings reveal a shift towards informal collaboration, as evidenced by the direct referencing of content from other organizations, resulting in a more decentralized collaboration structure of the ecosystem.

Keywords: Ecosystem evolution, platforms, decentralization, network analysis, news media

INTRODUCTION

Collaboration among rival firms is a frequent characteristic of business ecosystems (Hannah & Eisenhardt, 2018; Jacobides et al., 2018; Kapoor, 2013). In many cases, central firms such as platforms shape the formal structure through which collaboration takes place (Adner, 2017; Kretschmer et al., 2022), while other ecosystem participants operate within this structure, enhancing product value for consumers by offering complementary products and services (Shipilov & Gawer, 2020). It is commonly understood that the motivation for engaging in collaborative practices despite competing for consumers is the prospect of "win-win" outcomes for all participants, such as collective innovation, safeguarding against technological change, or augmented value propositions.

Consider, for example, the news ecosystems in most countries, i.e., the networks comprising national and local newspapers, news agencies, specialized publishers, and news media firms. A common form of "win-win" collaboration in these ecosystems is the use of news generated by others through citations, typically by crediting a central platform such as a news agency as the information source in a piece of news. This practice allows larger organizations to amplify their visibility if their stories are picked up by the news agency while letting smaller organizations report on stories that their resources would otherwise be unable to cover. The practice of citing new stories fosters inter-organizational complementarity in that backend information exchange coexists with front-end competition for reader attention. Moreover, as citations can be seen as a signal of conferred status (Gulati et al., 2000; Podolny, 1993), the ecosystem's collaboration structure reflects its social structure.

However, how performance shortfalls of the central platform, and ultimately its very existence, affect collaboration among ecosystem participants, and thereby ecosystem adaptation

and evolution more broadly, remains largely unexplored. Specifically, while the role of platforms is well-documented, our understanding of how complementors adapt in situations when the platform may fail to maintain the collaborative structure is underexplored (Burford et al., 2022). Relevant prior work on ecosystem evolution has focused on various aspects, including the impact of disrupters (Ansari et al., 2016; Snihur et al., 2018), how central firms promote change through the enforcement of rules (Daymond et al., 2023), the interplay between competition and collaboration (Gnyawali et al., 2006; Hannah & Eisenhardt, 2018; Hoffmann et al., 2018), tensions between complementors' value creation and appropriation (Wang & Miller, 2020), ecosystem change in reponse to shifts in complementarity and coordination (Holgersson et al., 2022), free-riding effects at different evolutionary stages (Cennamo & Santaló, 2019), or changes in collaborative behavior from legal conflict (Jones et al., 2021). While these studies offer valuable insights into ecosystem adaptation in general, and collaboration dynamics in particular, large sample longitudinal evidence of collaboration as a function of the performance of the central firm in the ecosystem is absent. Investigating these dynamics from a processual view is crucial (Daymond et al., 2023; Spigel & Harrison, 2018), as it remains unclear whether turmoil surrounding an ecosystem's central firm may detrimentally impact the evolution of the entire ecosystem.

In this paper we ask *how uncertainty regarding the performance and future of the central platform affects the dynamics and structure of ecosystem collaboration.* To address this question, we conducted a large-*N* two-decade longitudinal analysis of the Danish news ecosystem, which provides an insightful empirical context by allowing us to 1) trace the information flows between ecosystem participants through citations, and 2) investigate the impact of changing information flows on collaboration structure. Specifically, we utilize a crisis experienced by the news agency

Ritzau – the central platform in the ecosystem – between 2008 and 2015. Like many of the leading news agencies (e.g., Associated Press, Agence France-Presse, Deutsche Presse-Agentur), Ritzau is partly governed by competing news outlets, and when a large media house left the agency, the role and survival of the ecosystem's central firm was put into question. Moreover, because almost one in five articles produced by the Danish news ecosystem involves a citation to Ritzau, the crisis threatened the productivity of the ecosystem and the survival of individual news organizations. Leveraging this crisis of the central platform allows us to investigate how complementors adapted their behavior and how the ecosystem's collaboration structure changed as a result.

Our conceptual argument is that in digital ecosystems such as news media, a potential consequence of a platform experiencing a performance crisis is a behavioral shift by complementors toward "platform bypass": informal direct collaboration among themselves that circumvents the platform, ensuring that collaborative ecosystem activities persist despite the central firm's looming failure. Our argument combines perspectives found in the ecosystem literature (Adner, 2017; Jacobides et al., 2018) with ideas from the status-based model of market competition (Podolny, 1993; Podolny & Phillips, 1996; Stuart et al., 1999). Specifically, in a status-based model of market competition, being cited is a way to further the status position of a firm in an ecosystem, thus creating incentives for both the citing and the cited news organizations to collaborate in a way that bypasses the platform.

We document the emergence of platform bypass and its impact on collaboration structure using a mixed methods design and triangulation to validate our results, including network analysis of 1.5 million citations among 5.2 million news articles, qualitative interviews, and archival data. Our analysis shows that the crisis surrounding the news agency Ritzau, the central

platform in the ecosystem, led to the adaptation of direct citations among competing complementors, which (temporarily) resulted in a more widely connected network and a less inequal citation distribution across the network of news organizations in the ecosystem.

Our results highlight how uncertainty regarding the continued performance of the central firm may lead to increased informal collaboration between complementors that bypass the platform, in turn decentralizing the ecosystem. In contrast to formal collaboration, the structure of which is orchestrated by the platform, informal collaboration is an uncoordinated arrangement that is silently agreed upon between complementors. Such temporary shifts toward informal collaboration in ecosystems have not been documented before and highlight the adaptative capacities possessed by complementors in ecosystems, allowing them to shift to informal collaboration as a temporary answer to uncertainty regarding the central firm. We consider this adaptiveness to be an important feature of platform ecosystems, not the least because of the democratic importance of ecosystems such as news media, but also for ecosystems in general, as the ability to adapt to a decentralized collaboration structure may ensure ecosystem persistence despite uncertainty about the central firm. In addition, adaptive behavior as documented in our study may well denote the contours of structural changes that transform an ecosystem from a platform-centric model towards a different, more decentralized, type. Our notion of a platform bypass effect and the evidence of informal uncoordinated collaboration as presented in this paper thus contributes to the ongoing discussion of ecosystem evolution.

CONCEPTUAL BACKGROUND

The News Industry as a Platform-based Ecosystem

The exact operationalization of "ecosystems" is still under debate (Jacobides et al., 2024): some scholars define ecosystems in terms of their alignment structure toward a shared value proposition (Adner, 2017; Kapoor, 2018); some highlight non-generic complementarities and multilateral interdependencies as the main characteristics (Jacobides et al., 2018); others emphasize the networked aspect of ecosystems as sets of interconnected, but autonomous and self-interested, actors (Baldwin, 2020; Baldwin et al., 2024; Bogers et al., 2019). Yet despite these different perspectives, there is wide agreement that a central firm is needed to align interests through developing mutual understanding, securing ecosystem-specific investments, and nurturing coordination and cooperation among participants (Foss et al., 2023). In the specific case of platform ecosystems, the central firm governs a platform to which the complementors connect (Baldwin et al., 2024; Kretschmer et al., 2022). The architecture of the platform itself can take various forms, including a multi-sided platform (MSP) structure whose main business model is to facilitate connections between multiple sides (McIntyre & Srinivasan, 2017).

Following the above characterization, the news industry can be conceptualized as a platform-based ecosystem. The national Danish news agency Ritzau, for instance, acts as a central MSP that facilitates information exchange between news sources (e.g., press releases, wire news, international sources, international news agencies) and news organizations (e.g., newspapers and specialized publishers) that function as complementors to the agency. Ritzau is a cooperative that is owned by some of the largest conglomerates among the news organizations who, despite being rivals, jointly invested in Ritzau to secure a cost-effective general information

flow to all through a centrally governed platform. Figure 1 summarizes the relationships between the MSP, the complementors, and the readers in the news ecosystem.

Insert Figure 1 about here

With these ecosystem-specific investments into an MSP, it became less costly for news organizations to report on general matters while also catering to their specific customer groups through customization, enabling unique complementarities (Jacobides et al., 2018). This platform ecosystem architecture is not exclusive to the Danish news context, but is also evident in for example Austria and Sweden (Jääskeläinen et al., 2021), and many of the world's largest news agencies (e.g., the American Associated Press (AP), the German Deutsche Presse-Agentur (dpa), or the British PA) are cooperatively owned platforms like Ritzau. News agencies are embedded in international news agency networks (e.g., the European Alliance of News Agencies), and are responsible for the rapid global flow of news information to news organizations. As end consumers only get access to the end product via a complementary news organization, the impact of news agencies often remains underappreciated, despite their key role as a hidden nerve system steering international news streams.

Ritzau has through decades set precedents for citations of the source of information as being a key part of information-sharing among Danish news organizations, i.e., inducing a shared understanding of the rules for collaboration in the ecosystem (Adner, 2017; Foss et al., 2023). Concretely, news organizations must cite the news agency whenever they build upon the information that the agency gathers and aggregates from its large information network, allowing news organizations to complement the base products through customization. The news agency's business model builds on subscriptions from the complementors, who in turn rely on a

combination of subscriptions and ad revenue from end consumers. Due to these characteristics, we conceptualize news ecosystems as consisting of a set of interdependent but autonomous news organizations (Baldwin, 2020; Bogers et al., 2019) that have made ecosystem-specific investments in a shared news agency (Foss et al., 2023). The news agency is structured as a MSP that has put forth precedents and formal standards for how to collaborate in the news setting (Adner, 2017).

Citations and Social Structure in News Ecosystems

How can news organizations use others' stories and cite the originator, given that firms typically try to retain exclusivity over their products by precluding competitors from producing goods that are overly similar, such as by obtaining patents or securing copyrights? One could imagine that when a news organization cites a competing organization in an article, this might be interpreted as the originator losing out on profit potential through the additional clicks and ad revenue that comes from exclusivity due to the competitor piggybacking on the original article. However, the usual incentives for maintaining exclusivity are less applicable in news ecosystems, as news articles have only a somewhat momentary value for their producer, i.e., while they are still "newsworthy" and can draw consumer attention (Meyer et al., 2024). In addition, news products are easily reproduced and imitated (Cozzolino & Rothaermel, 2018), thus diminishing the persistence of their value.

Instead, citations represent a signal of value and status about the cited organization. To consider this notion, we draw on Podolny's definition of status as "the perceived quality of that producer's products in relation to the perceived quality of that producer's competitor's products" (Podolny, 1993). That is, status is a variable that captures reputation, perception of quality, social influence, and professional recognition as they build over time. Thus, being historically known

for having the highest quality news stories, being fast to report on topics, being trustworthy, and having a significant brand value are all factors that serve to accumulate status for an organization over time (Podolny, 1993). Therefore, if a competitor imitates the originator's story through citation, it may prove advantageous to the originator, because a bi-product of the citation is status under the premise that citation expresses endorsement from the citing competitor (Stuart et al., 1999), and is thus an accumulation of positive association (Washington & Zajac, 2005). From this viewpoint, imitation from competitors is not detrimental to an organization's success but might instead drive it toward a central status position in the ecosystem, which can be used strategically in the future and improve market performance (Benjamin & Podolny, 1999; Han, 1994; Shipilov & Li, 2008). We thus argue that citations from competitors are a valid metric to assess the position of an organization in news ecosystems.

Formal and Informal Collaboration

But how do citations and ecosystem structure change when the central MSP in a news ecosystem experiences a crisis, leading to uncertainty about its future? In this situation, we would expect a move toward informal collaboration. Formal collaboration often hinges on alliance formation between firms or joint ventures (Gulati, 1995), such as a shared platform like Ritzau through which complementors share and access information. In contrast, informal collaboration denotes collaborative arrangements that are 1) emergent, meaning that they are favored and given priority in situations of uncertainty, e.g., about the ecosystem's central firm, and 2) non-formalized, meaning that they are not codified in contracts nor enforced by a singular central actor, but 3) are not dramatically different from established formal collaboration practices, and rather small adjustments to collaboration based on the habits and routines that have become institutionalized in the ecosystem over time, i.e., informally continuing "business-

as-usual". By temporarily shifting to informal collaboration in times of uncertainty about formal collaboration, despite it being potentially less efficient than formalized collaboration, participants in the ecosystem can buffer the system for the foreseeable future. The citation practices between complementors we observe in the news ecosystem fit the parameters of this type of collaboration. It is a non-formalized practice that is engrained in the implicit rules of the journalistic field by way of journalists' professional norms. As such, in the specific case of news ecosystems, when informal collaboration is expressed through citations, it entails that actors accept competitors borrowing their stories and information as long as the source is cited. The logic behind this is that the originator is paid for their story in the commodity of endorsement and status through such citations (Stuart et al., 1999).

A move toward informal collaboration may therefore involve what we term *platform bypass*, denoting cases where complementors collaborate directly by circumventing the central firm that previously set standards and alignment for collaboration activities. While a loss of control and authority for the central firm, the ability to bypass the platform in uncertain times allows complementors to conduct business as usual, and the ecosystem to survive a crisis by maintaining collaboration practices. Platform bypass may not necessarily be a permanent state, but may be substituted by a return to formal collaboration once the crisis is resolved, or when a new firm takes on the role as the central firm. Thus, while earlier work indicates that conflict between firms can increase their tendency to collaborate (Jones et al., 2021), we expect instead that the uncertainty regarding a central firm and platform such as a news agency leads to formal collaboration being partially replaced by informal collaboration, where direct collaboration between complementors bypasses the central firm. Specifically, we propose:

> **Hypothesis 1 (H1).** *When the central firm in an ecosystem experiences a crisis, complementors will increasingly collaborate directly, thus bypassing the central firm.*

Building on a status-based model of market competition, as changes in citation practices occurs, for example through platform bypass and informal collaboration among complementors, these will lead to changes in an ecosystem's status order. We understand such changes in the social status order as an expression of changes in ecosystem structure (Uzzi, 1997). Furthermore, and going beyond economic implications, the reshuffling of status positions may have a profound social impact when they take place in ecosystems that possess democratic importance, because the restructuring might influence the basis on which vital information is passed to citizens.

To help describe structural changes in ecosystems due to uncertainty regarding the ecosystem's central firm and shifts in collaboration practices, we consider two central (and opposing) processes: centralization and decentralization. With *decentralization*, we mean the process whereby a higher number of actors in a network come to accumulate relatively more status, and previously central actors obtain relatively more peripheral positions — and vice versa for the process of *centralization*.

Previous literature suggests that industry "structure-loosening" events can have the effect of temporarily decreasing network centralization (Madhavan et al., 1998). Such events provide opportunities for less peripheral actors to improve their centrality such as their position in the status order. We therefore expect the structure of the news ecosystem to change during uncertainty regarding the central firm because of the emergence of orchestrator bypass, which empirically corresponds to more direct ties between complementors in the network structure that circumvent the central platform and a less concentrated distribution of citations in the ecosystem.

> **Hypothesis 2 (H2).** *As a result of informal collaboration and platform bypass, the ecosystem will become more decentralized.*

While we expect a more decentralized structure due to informal collaboration and platform bypass, we do not expect the status order to be randomly reordered. Rather, as a high-status actor in the network — the central platform — loses centrality, we expect other already-established high-status actors to gain more from the process of decentralization than lower-status actors (Podolny, 1994). We expect this due to the informational nature of news ecosystems, where the quality and validity of information might be assessed via status positions and signals (Uzzi, 1996). Therefore, if a news organization has established a good reputation and is perceived as a high-status actor both within and beyond its direct ties, it is more likely to be chosen as a tie from other organizations (Chung et al., 2000; Gulati & Gargiulo, 1999; Han, 1994; Podolny, 1993; Washington & Zajac, 2005). Empirically, we expect this to be observable by high-status news organizations becoming more central, as they receive more citations from competitors compared to organizations in lower-status positions, despite an overall decentralization process.

> **Hypothesis 3 (H3).** *Decentralization of the ecosystem favors mainly previously established complementors that become more central.*

We empirically investigated the three hypotheses above in the context of the Danish news ecosystem. However, the hypotheses might be applicable to other (digital) ecosystems that involve formal collaboration orchestrated by a central firm.

DATA AND METHODS

To test our hypotheses, we used a mixed methods research design, building on qualitative interviews, archival data, and citation network analysis. Our hypotheses required inquiry at two analytical levels. On the one hand, we proposed that collaboration behavior changes under uncertainty regarding the performance of the central firm in the ecosystem. We operationalized

such behavioral adaptations as changes in citation practices during the Ritzau crisis. Insight into the behavioral changes is facilitated with our data collection and processing procedures. On the other hand, we proposed that changes in collaboration behavior will alter the collaborative structure of the ecosystem. We measured this effect via the structural properties of the citation networks.

Sampling News Media Organizations

The mapping of behavioral changes and status positions over time required a longitudinal dataset. Moreover, to obtain a robust and precise account of the ecosystem over time, the dataset had to be comprehensive. This required a delineation of which news organizations should be included in the analysis, as well as a systematic data collection process.

The context of the analysis was the Danish news media ecosystem, comprising organizations that provide news coverage on the web either on a local/regional, or national scale in Denmark. Specifically, a list of all news organizations registered in the media archive from the Danish media surveillance company Infomedia was downloaded, and each news organization in the list (N = 1,210) was manually coded as included/not included in the sample. Each website was visited, and characteristics were outlined based on front-page articles and information in the "About" sections of the web pages. The criteria for inclusion of a source were that it 1) provided either locally/regionally/nationally oriented news daily in Denmark, 2) was not a magazine or exclusively reporting opinion pieces, and 3) used Danish as its main language. Following this procedure, the sample for the analysis consisted of a total of 382 news organizations (see online Appendix A), of which 305 were manually marked as local/regional in their coverage, and 78 marked as nationally oriented.

Collecting Citation Data

As citations express behavioral changes, we can link behavioral change to specific points in time, and further, aggregate them to the network level. Citations were defined as mentions/links to competing news organizations in the body text of a news article, e.g., "… writes *Berlingske*". Mentions of Ritzau in either the byline or body text of a news article were also included as citations. We use Infomedia's proprietary and comprehensive Media Archive dataset and the company's Media Research API to collect unique news articles published online by the selected news organizations. All news organizations consented to using their articles for all years, except one large media conglomerate. Brands belonging to that media conglomerate were dropped from the analysis to ensure consistency in the sample across years, although these news organizations are still included as citation targets. To carry out a temporal analysis, the counts of total citations to/from all news organizations in the sample per year were needed. This was achieved by iterating over each article in the dataset, cleaning it for artifacts (e.g., HTML), and storing its metadata (e.g., date and source news outlet) along with any mentions of competing news organizations or agencies. We also extracted the annual article counts stored in the media archive.

Following this procedure, we obtained all citations among a total of 5,205,236 articles for the 18-year timeframe. In total, 1,516,736 articles contained a minimum of one citation of a competitor or Ritzau, amounting to approximately 29 percent of all articles.

Obtaining Qualitative Data

Along with the textual and quantitative data, we conducted eight semi-structured interviews with journalists, editors, and management from a national Danish news agency, local/regional news organizations, as well as the biggest national media houses in Denmark. The

aim of the interviews was to inquire about our conceptualization of citations as an expression of status through the interviews. Doing so, we avoid introducing a theoretical assumption about the role of citations and can instead quote evidence of their social and professional meaning. The interviews were semi-structured to ensure consistency and were conducted virtually, recorded, and automatically transcribed in Danish. All interviewees consented to be quoted in our paper, but we assured anonymity to all interviewees and thus removed all names, workplaces, and otherwise revealing information.

Archival data was manually collected by searching for news articles about Ritzau during 2005-2022 in the Infomedia database ($N = 96$), and the 'About' page on ritzau.com. The archival data was obtained to pinpoint key dates surrounding the news agency's crisis for the quantitative analysis, to get insight into important events, and to achieve a saturated contextual understanding of the public discussions and criticisms leading up to the crisis.

When relevant, translated excerpts from the interviews are included as supplements to quantitative results. By doing so, we 1) provide context for the quantitative results and nuance our interpretations of them, and 2) triangulate our findings and assess ambivalences between the qualitative and quantitative domains, using the interviews as robustness checks and the archival data for contextualization (Jick, 1979).

Measuring Centralization

To investigate how changes in collaboration behavior have implications for the structure of the ecosystem, i.e., the extent and dynamics of (de)centralization over time in the status ordering of news media organizations, we conducted a citation network analysis. While different network centrality measures have been proposed to calculate a node's importance in a network (e.g., eigenvector centrality, in-degree centrality, and betweenness centrality), we used the

PageRank (PR) algorithm, a variant of eigenvector centrality developed by Google's Larry Page to rank a website's importance based on the amount and quality of its incoming links in large datasets (Page, 2001).

We chose this algorithm for three reasons. First, the PR measure allows for comparing score distributions over years due to normalization. Second, the PR measure can account for directed ties in contrast to eigenvector centrality. Lastly, because PR is a relative measure, meaning that the centrality of one node depends on the centrality of others, it makes it possible to treat centrality as a scarce and limited resource, which fits well with perceiving status as a commodity that organizations compete for.

We applied the PR algorithm to assess the centrality of news organizations in the networks at different time points, since we conceptualize incoming citations, and the quality of a news organization's affiliates (Podolny & Phillips, 1996), as indications of an organization's status position and centrality. This is where the PR measure has advantages over for example in-degree, as a citation from a reputable competitor weighs more than a citation from a low-scoring competitor. Further, with the granularity that the PR approach involves, we can both look at individual organization's status position trajectories over time, as well as trajectories on an aggregate level, e.g., the difference between local/regional news organizations' centrality developments versus that of national news organizations.

The PR score is used as a measure of a news organization's position in the status order on an annual basis. All directed networks contain nodes for each active news organization for a given year, where edges are weighted by the citation counts from node X to node Y during that year. All prior and future citations outside the given year are disregarded in the calculation of PR scores: i.e., the status order is "reset" each year. The method can be understood as a simulation

of a "random surfer" that randomly clicks links on webpages until they either stop or reach a page without any links (a "sink"). A web page's PR score is an expression of the probability that the random surfer will land on the webpage. For our purpose, pages are substituted for nodes in a citation network of news organizations. For each year in the timeframe, we construct a citation network and, using the power iteration method, calculate each node's PR score as

$$PR(p_i; t+1) = \frac{1-d}{N} + d \sum_{p_j \in M(p_i)} \frac{PR(p_j; t)}{L(p_j)}$$

where *N* is the total number of nodes, p_i is the individual node, $M(p_i)$ expresses the group of nodes linking to p_i, $L(p_j)$ is the number of citations from node p_j, and the damping factor *d* is set to the default .85. The damping factor is the probability that the "random surfer" will continue clicking a link in the current step of the iteration and is introduced to avoid getting stuck in "sinks" or citation loops (Page, 2001). Due to the relative nature of the centrality measure, a node's PR score is partially derived from other nodes' PR scores. All PR scores in a network always sum up to 1.

To assess the extent of (de)centralization in the yearly networks, and to test H2, we use the network centralization formula proposed by Madhavan et al. (1998), which in our case measures the average distance between the PR score of the most central firm to the rest in the network:

$$Network\ centralization\ = \frac{\sum C_{max}\ -\ C(node\ i)}{n\ -\ 1}$$

where *n* is the total number of nodes in the network, *C is* the PR centrality score for an individual node *i* and $C_{\max}$ is the PR score of the most central node in the network.

Testing Hypotheses

Besides the use of visualizations, the network centralization measure, and qualitative excerpts, we use OLS regression models to test H1, and Beta regression models to test H3 to check the robustness of our results.

For OLS models, we construct a panel dataset ranging from 2005-2016, containing each organization's daily count of citations. The dependent variable is *BypassingCitations* which contain the count of incoming citations that flow directly from a complementor, i.e., citations that are not directed at Ritzau. Due to the presence of many zeros in the dependent variable, its values are transformed with *log*(+1). Further, we include controls for *Coverage*, a dummy variable where 0 denotes local and 1 denotes national coverage, respectively, *Type*, which is a categorical variable that denotes the type of national news organizations (Daily, Online, Industrial, Niche or Tabloid), and *PlatformCitations*, denoting the daily count of citations flowing to Ritzau that given day, transformed using *log*(+1). To test whether the hypothesized increase in bypassing citations is associated with uncertainty around Ritzau before the subsequent exit of collaborators, or solely with the point in time where complementors exit the agency, we use the variable *PlatformUncertainty* for the years 2008-2010, where public criticism of the agency was put forth, and the *PlatformExit* variable for the years 2011-2015, where central players in the ecosystem had exited the news agency. Table 1 shows descriptive statistics for variables used in the regressions.

Insert Table 1 about here

To avoid multicollinearity in our regression models, we did not include the variables *Coverage (National), Type,* and *BrandTrust* simultaneously. This decision is based on the high

correlations observed in Table 1, specifically the high correlation between *Coverage* and *BrandTrust* (r = .84) and *Type* (Daily) (r = .75). Further, *BrandTrust* highly correlates with *Type (Daily)* (r = .83). Variables were Z-score standardized for inclusion in OLS regressions.

To test H3, we instead use *PageRankCentrality* as the dependent variable, which contains the PR score for each complementor in the annual directed citation networks, excluding the PR score for Ritzau. We include the same controls as described above. Because PR scores are non-normally distributed probabilities falling in the range [0, 1], we switch to beta regressions with a logit-link function, which transforms the mean of the dependent variable onto the real line, allowing us to model the relationship between the independent variables and the dependent variable on an unrestricted scale. The inverse logit function then maps these values from the real line back to the [0, 1] interval, ensuring that the predicted values remain within this bounded range. With this approach, we can effectively model the distributional characteristics of PR scores. The precision parameter denotes the variability of the dependent variable around its mean in the beta distribution.

RESULTS

The Rise of Bypassing Citations

With digitalization came the increasing ease of information search and the possibility of immediate reporting. This resulted in a growing number of news organizations in the news ecosystem that adopt citation practices in their news production, as seen in Figure 2. Further, we observe that a higher fraction of nodes in the citation networks became connected during the uncertainty regarding the central news agency, Ritzau, that experienced a crisis from 2008-2015 when owners left the cooperative, and the future of this central firm was deemed uncertain by

both experts and Ritzau's top management (see online Appendix B for further details). During this period, news organizations increasingly cited a wider variety of other organizations.

Insert Figure 2 about here

The widespread adoption of citation practices also resulted in an overall increasing number of articles that use citations over time, as seen in Figure 3. However, while the annual sum of articles increased remarkably in 2010, we observe a downward trend in article counts and citations during the Ritzau crisis, as well as the subsequent years, before a steep increase starting in 2020.

Insert Figure 3 about here

As discussed above, we distinguish between formal and informal collaboration. Empirically, formal collaboration is translated to citations of Ritzau, either in the body of an article or its byline, due to Ritzau being a central firm with orchestrating responsibilities. We refer to citations adhering to this requirement as *platform citations*. Conversely, *bypassing citations* refer to informal and direct citations of competing news organizations in the body text of an article. 79 percent of all citations are platform citations. The rest, comprising a total of 313,378 citations, are bypassing citations, where the target of the citation is a competing news organization. As seen in Figure 4, the crisis experienced by the news agency is reflected in the incoming citation counts to Ritzau — its main performance indicator according to its CEO — which dropped from 2010 to 2014. At the same time, Figure 4 also shows that bypassing citations increased in the period of the Ritzau crisis. While the total percentage of articles

containing such bypassing citations remains relatively low compared to platform citations, some of the platform citations are clearly replaced by bypassing citations.

Insert Figure 4 about here

Table 2 shows the results from our OLS regressions. The regression results support H1, showing a significant positive effect of *PlatformUncertainty* and *PlatformExit* on *BypassingCitations*[1]. In Model 2, a one standard deviation increase in *PlatformUncertainty* and *PlatformExit* is associated with a 0.029 percentage point ($p < .0001$) and 0.024 percentage point ($p = .0001$) increase in *BypassingCitations*, respectively. In Model 4, when controlling for *BrandTrust* and *PlatformCitations*, these effects increase to .401 percentage points ($p < .0000$) and 0.480 percentage points ($p < .0000$), respectively. These findings indicate that uncertainty and exit around Ritzau lead to more informal collaboration bypassing the central firm. Additionally, Model 4 shows that *BrandTrust* significantly influences *BypassingCitations* ($\beta = 0.452$, $p < .0000$).

Insert Table 2 about here

To illustrate a bypassing citation, and the role it has according to insiders of the journalistic field, we provide an example and excerpts from interviews. A typical bypassing citation was evident when the Danish reality TV celebrity Sidney Lee suddenly passed away. Following his death, a Danish tabloid newspaper, Ekstrabladet, reported this event on its website. Shortly after Ekstrabladet broke the story, competing news organizations published the same

[1] As a robustness check, we merged the two variables into one variable covering the entire Ritzau Crisis period, and still observe positive effects on *BypassingCitations* from the Ritzau Crisis across all models.

story, thereby quoting Ekstrabladet on the news. Figure 5 shows a screenshot from TV2.dk where the citation of Ekstrabladet is highlighted. The first paragraph of the body text states: "The reality star Sidney Lee is dead. His family confirms this to Ekstrabladet." As such, a competing news organization to Ekstrabladet explicitly states that it did not collect the information and publish the story first, but rather assign that status to Ekstrabladet.

Insert Figure 5 about here

One could then ask why a news organization might be inclined to cite a competitor. It could be argued to be more feasible to simply publish the same story as Ekstrabladet and leave out the citation. However, among journalists, professional norms suggest that one should, if possible, cite the source from which relevant information was obtained. The obligation to adhere to these standards, even though they are not formalized, was voiced by several interviewees:

> *[talking about taking stories from competitors] Yes you cite them. There are these rules that we have. (Editor, local news outlet)*
>
> *We are not above citing and giving them the credit that they had the story first, and now we have joined in. (Editor on duty, regional news outlet)*
>
> *We always cite. Often with links so people can go read the original source themselves. … We always cite when we have to. (Editor, national news outlet)*

In the interviews, we were presented with widespread alignment with this collaborative practice. A biproduct of this adherence is the generation of status that is attributed to the cited organization, due to the signal it sends of the organization as a reputable and truthful source by competitors that consciously and explicitly trust and rely on the information. This interpretation of citations as a status indication was also indicated in interviews:

> *…That we have stories that are so important to the agenda that others need to cite us, I absolutely think that is positive. As I said, it is preferable to be in that part of the food chain than to be at the other end where you must go hunting elsewhere to tell the stories you find necessary. … When I went to journalism*

school, it was seen as a quality stamp if you had made a story- Especially if it was cited in [national radio news broadcast] and other places. (Editor, national news outlet)

Following our premise that high status signals a central position in the ecosystem structure, such citations from outsiders may improve a firm's competitive stance (Gnyawali et al., 2006). Further, the example highlights well the ambivalences that characterize collaboration and competition dynamics in ecosystems (Hannah & Eisenhardt, 2018). On one hand, actors may collaborate on inputs, but on the other hand, actors may compete for reader attention. Based on the findings above, we thus find evidence in support of H1.

Changes to the Ecosystem Structure

During the crisis and the subsequent rise of bypassing citations, Ritzau's central position in the ecosystem declined. This can be seen when comparing networks for different years (Figure 7), where the network from 2008 is highly centralized around one purple node (Ritzau) with limited amounts of ties between other nodes. However, the network from 2013 shows more nodes than earlier, as well as more edges between competing nodes, i.e., citing that circumvents the platform becomes more widespread. In other words, the network takes on a more decentralized structure during the peak of bypassing citation activity. This is also apparent in Figure 6.

Insert Figure 6 about here

As seen in Figure 6, Ritzau's centrality decreases during its crisis. Further, a dip in the otherwise increasing centralization trend is taking place during the Ritzau crisis, suggesting that the network becomes relatively more decentralized during the peak of bypassing citations. One could argue that this is a more robust ecosystem structure, compared to a more centralized

structure, where there is greater reliance on the survival of a single node and higher vulnerability to unexpected exits or shocks (Uzzi, 1997). In contrast, the decentralized structure enables the network to survive despite other nodes potentially breaking away from the ecosystem.

Insert Figure 7 about here

After the Ritzau crisis, we see that bypassing citations decreased again, seemingly in favor of platform citations which once again increased (Figure 4). This is also observable in Figure 6 as Ritzau returns to a more central position in 2018 which continues for the remainder of the analyzed period. Editors and journalists also highlight how Ritzau has improved in recent years, for example:

> *… They are doing a really, really, good job, Ritzau. They have had a great development during the last couple of years … They got some competition a while back, so they sharpened their focus on what we [news outlets] need and are very attentive to our needs. (Editor, national media outlet)*

This perception of Ritzau being more attentive to the needs of the complementors may explain the increasing citations of the central firm. However, despite Ritzau's return to a central position, we still observe edges between nodes outside Ritzau to a greater extent than earlier in 2018. This suggests that the platform bypass was to some extent a temporary solution to the uncertainty regarding the central firm, although it did not dissipate once Ritzau overcame its crisis. Instead, bypassing citations co-exists alongside platform citations.

Thus, we find that the uncertainty regarding the central orchestrating firm led to an ecosystem that was less dependent on Ritzau as a key hub for citations, and a more connected network outside Ritzau, i.e., a more decentralized structure. As Ritzau returns to its central position, and certainty regarding the central firm's performance and future survival returns,

bypassing citations decreased. We thus find evidence in support of H2, as the ecosystem changes toward a decentralized structure due to platform bypass, as reflected by a less inequal distribution of status.

Who Gains from Decentralization?

As shown above, the network structure became relatively more decentralized during the crisis. Previous research shows that market uncertainty can lead to an orientation toward social structural positions when considering exchange relationships (Podolny, 1994). The question arises as to which ecosystem actors stand to gain the most from the Ritzau crisis. In Figure 8, the mean PR scores are visualized for different segments of the news ecosystem over time. We observe that several segments experienced increases in mean PR scores as the Ritzau crisis started in 2008.

Insert Figure 8 about here

While the different segments in general follow the same pattern, the peaks are higher for some than others. For example, high-trust news organizations receive higher mean PR scores than the overall legacy media segment does. As high-trust organizations are primarily the oldest and already well-established high-status players in the news ecosystem, the turn to bypassing citations seems to favor the pre-crisis higher-status players more than the mid- or lower-status organizations. In a sense, the status that Ritzau lost during its crisis was primarily redistributed to the other high-status actors in the news ecosystem, and less so to mid- or lower-status actors. In Model 3 in Table 3, which includes the results from beta regressions, besides *PlatformUncertainty* ($\beta = 0.699$, $p = .0008$) and *PlatformExit* ($\beta = 0.743$, $p = .0001$), we likewise find a positive significant effect of *BrandTrust* on a firm's increase in *PageRankCentrality* ($\beta =$

0.676, $p = .0011$). In Model 2, we see a positive association for daily newspapers as well ($\beta = .694$, $p < .0000$).

Insert Table 3 about here

These findings align with expectations outlined in the status literature, where market uncertainty is argued to narrow the field of potential partners to players with whom the organization has already dealt — the high-status actors — as a satisficing solution (Podolny, 1994). We find the same logic voiced in interviews with editors:

> *[talking about citing other media] … For example, if you were to quote something like Times Magazine or a more colorful celebrity magazine from the US … Then I could not imagine that you would then add "writes Times Magazine" without also adding "according to AP" [an American news agency], because they have then assessed whether it was true or not. (Editor, national media outlet)*

We see in the excerpt that the existing understanding of status and trustworthiness of other sources are used as a shorthand to assess the quality of information, and that citing a low- or mid-status organization is less likely without the endorsement of high-status organizations.

Thus, we find evidence that the adoption of bypassing citation strategies was associated with network decentralization. It should be noted, however, that Ritzau retained its position as the highest PR scoring node throughout almost the entire period, yet its PR score is lower during than before and after the crisis, respectively. Thus, while the Ritzau crisis was to some extent a "structure-loosening" event (Madhavan et al., 1998), it did not radically alter the ecosystem structure.

Based on these findings, we find moderate support in favor of H3 which states that the main beneficiaries of the move toward a decentralized ecosystem structure are pre-established

high-status organizations. While many organizations benefited from the structure-loosening event of the Ritzau crisis, it indeed favored pre-established high-status organizations relatively more than mid- or low-status organizations. This suggests that high-status organizations in an ecosystem may improve their position in the ecosystem by strategically introducing uncertainty regarding the performance and future viability of the ecosystem's central platform.

DISCUSSION AND CONCLUSION

Formal collaboration in different forms is a common practice among news organizations, most notably through news agency cooperatives which have been jointly owned and governed by competing news organizations as far back as the 19th century. However, due to the advent of the Internet and digitalization of the news ecosystem, transaction and information search costs have been reduced drastically (Adner, 2017; Cozzolino & Rothaermel, 2018). Our analysis of the Danish news ecosystem showed that a crisis surrounding the ecosystem's central firm under these circumstances enabled the rise of informal collaboration through real-time monitoring and citing other news organizations without needing to go through a central platform. We labeled this phenomenon *platform bypass.* In the case of the news ecosystem, platform bypass is expressed as direct citations between complementors without formal collaboration agreements.

Platform bypass may arise under circumstances defined by 1) informal collaboration between complementors that is made possible by professional ideals and values to secure alignment without governance from a central firm, and 2) uncertainty regarding the performance and future survival of the ecosystem's central firm which incentivizes alternative collaboration practices to secure firm and ecosystem persistence. Where the literature has primarily focused on how ecosystems are governed and ruled by the firm in the platform position, we show that

complementors may also informally continue collaboration practices without the need for a central firm to align the complementors, which may denote the contours for transforming the platform ecosystem into a different type of ecosystem. It should be noted, though, that the crisis of the platform in our case did not lead to a major revolution in the ecosystem and the complete dismissal of the platform. Rather, the uncertainty led to complementors beginning to explore and alter their collaboration practices, all the while still citing the orchestrator. Thus, the shift to informal collaboration complemented rather than substituted formal collaboration practices.

We believe that platform bypass may not be exclusive to the news context, but could also emerge in other ecosystems where the central firm experiences a potentially more consequential crisis that could lead to a major overhaul of the ecosystem structure and collaboration practices. One could, for example, imagine that complementors in the current Android ecosystem would self-organize and collaborate directly with each other if the survival of the central firm of the operating system, Google, came into question, e.g., through establishing alternative app stores or independent ROMs. However, the specificities of the platform bypass effect we observe are tied to the news context, and its emergence in other ecosystems is an open empirical question.

We hypothesized about the implications of uncertainty regarding the central firm in an ecosystem – an aspect currently underrepresented in the literature – and found evidence in favor of our expectations. However, alternative outcomes to the platform bypass effect and the more decentralized structure were also considered. One of these was that the complementors — several of whom have shared ownership of Ritzau — would have adapted to the crisis by intensifying their ties to the news agency, i.e., citing it more to support the company in which they had economic interests. Another alternative could have been that complementors simply used fewer citations in their news production and instead reoriented their production strategies,

e.g., by emphasizing journalistic quality or differentiation from competitors. However, despite these potential alternative effects, we believed that platform bypass was the most likely outcome due to the pressure to constantly publish news articles in the digital age.

Current scholarly work considers the creation, strategic challenges, and dynamics of ecosystems (Jacobides et al., 2018; Kapoor, 2018). This literature considers, for example, how platform ecosystems can be governed (Kretschmer et al., 2022; Zhang et al., 2022); how interdependent firms navigate competition and collaboration (Hannah & Eisenhardt, 2018; Kapoor, 2013; Sanchez et al., 2023); or how ecosystems evolve and react to uncertainty and entrants (Johnson et al., 2019). Adding to this body of work, our paper highlights the adaptiveness of ecosystems with high levels of collaboration, in the form of a (temporary) move to a more decentralized structure when the central actor in the ecosystem experiences setbacks. This finding questions the idea that networks will be less viable as a whole if there is an unforeseeable breakdown of their core actor (Uzzi, 1997). In this case, the ecosystem did suffer from the near failure of the central firm, as evident in an overall decrease in citations and articles during the news agency's crisis. However, these losses were mitigated to some extent by adapting at the behavioral level toward informal collaboration, and at the aggregate ecosystem level toward a decentralized ecosystem structure. Thus, uncertainty about the performance, and the potential loss, of the central firm may not necessarily lead to the demise of a functional ecosystem, if the various actors collectively, although informally, abide by informal collaboration practices that are mutually considered fair, and may instead contribute to ecosystem evolution. If future studies corroborate our results, it might point to adaptiveness and durability during uncertainty as a characteristic evolutionary trait of ecosystems with high levels of collaboration.

Our study has limitations that should be addressed in future research. Firstly, due to resource limitations, we do not analyze the content of cited and non-cited news articles, although this could provide insight into the extent to which citation is conditioned on for example story type, timing, or language features. Secondly, we do not trace articles that copy from competitors without citing them, as we only account for explicit mentions of the source. We therefore cannot exclude that the changes to citation patterns may also be due to adversarial responses such as copying competitors. Lastly, we cannot exclude the possibility that news organizations engage in other formal collaboration arrangements during the platform's crisis, e.g., via other news agencies. However, we document a partial shift toward informal collaboration practices. Despite these limitations, our methodological framework offers an approach to quantitatively trace changes in collaboration practices and the resulting ecosystem structure over time, while triangulating the results with qualitative insights (Jick, 1979), which can be used in future studies.

When ecosystems rely heavily on the performance of one actor, their structure is somewhat fragile, as unexpected shocks to the central firm will affect other interdependent actors in the ecosystem. Under those circumstances, failing to adapt to the uncertainty regarding the ecosystem's central firm could lead to collaboration breakdown and ecosystem collapse. At the same time, robustness and adaptability are vital characteristics, not the least for news ecosystems, as a breakdown of news coverage would be detrimental to the public democratic discussion and maintaining an informed citizenry. Seen through this lens, platform bypass is a viable survival strategy at both the organization and ecosystem levels, as it ensures continuation and potential ecosystem transformation despite the imminent breakdown of a central actor.

REFERENCES

Adner, R. (2017). Ecosystem as Structure: An Actionable Construct for Strategy. *Journal of Management*, *43*(1), 39–58. https://doi.org/10.1177/0149206316678451

Ansari, S. S., Garud, R., & Kumaraswamy, A. (2016). The disruptor's dilemma: TiVo and the U.S. television ecosystem: The Disruptor's Dilemma. *Strategic Management Journal*, *37*(9), 1829–1853. https://doi.org/10.1002/smj.2442

Baldwin, C. Y. (2020). *Design Rules Volume 2: Chapter 5—Ecosystems and Complementarities* (SSRN Scholarly Paper 3690595). https://doi.org/10.2139/ssrn.3690595

Baldwin, C. Y., Bogers, M. L. A. M., Kapoor, R., & West, J. (2024). Focusing the ecosystem lens on innovation studies. *Research Policy*, *53*(3), 104949. https://doi.org/10.1016/j.respol.2023.104949

Benjamin, B. A., & Podolny, J. M. (1999). Status, Quality, and Social Order in the California Wine Industry. *Administrative Science Quarterly*, *44*(3), 563–589. https://doi.org/10.2307/2666962

Bogers, M., Sims, J., & West, J. (2019). What Is an Ecosystem? Incorporating 25 Years of Ecosystem Research. *Academy of Management Proceedings*, *2019*(1). https://doi.org/10.2139/ssrn.3437014

Burford, N., Shipilov, A. V., & Furr, N. R. (2022). How ecosystem structure affects firm performance in response to a negative shock to interdependencies. *Strategic Management Journal*, *43*(1), 30–57. https://doi.org/10.1002/smj.3318

Cennamo, C., & Santaló, J. (2019). Generativity Tension and Value Creation in Platform Ecosystems. *Organization Science*, *30*(3), 617–641. https://doi.org/10.1287/orsc.2018.1270

Chung, S., Singh, H., & Lee, K. (2000). Complementarity, Status Similarity and Social Capital as Drivers of Alliance Formation. *Strategic Management Journal*, *21*(1), 1–22.

Cozzolino, A., & Rothaermel, F. T. (2018). Discontinuities, competition, and cooperation: Coopetitive dynamics between incumbents and entrants. *Strategic Management Journal*, *39*(12), Article 12. https://doi.org/10.1002/smj.2776

Daymond, J., Knight, E., Rumyantseva, M., & Maguire, S. (2023). Managing ecosystem emergence and evolution: Strategies for ecosystem architects. *Strategic Management Journal*, *44*(4), O1–O27. https://doi.org/10.1002/smj.3449

Foss, N. J., Schmidt, J., & Teece, D. J. (2023). Ecosystem leadership as a dynamic capability. *Long Range Planning*, *56*(1), 102270. https://doi.org/10.1016/j.lrp.2022.102270

Gnyawali, D. R., He, J., & Madhavan, R. (2006). Impact of Co-Opetition on Firm Competitive Behavior: An Empirical Examination. *Journal of Management*, *32*(4), 507–530. https://doi.org/10.1177/0149206305284550

Gulati, R. (1995). Social Structure and Alliance Formation Patterns: A Longitudinal Analysis. *Administrative Science Quarterly*, *40*(4), 619–652. https://doi.org/10.2307/2393756

Gulati, R., & Gargiulo, M. (1999). Where Do Interorganizational Networks Come From? *American Journal of Sociology*, *104*(5), 1439–1493. https://doi.org/10.1086/210179

Gulati, R., Nohria, N., & Zaheer, A. (2000). Strategic networks. *Strategic Management Journal*, *21*(3), 203–215. https://doi.org/10.1002/(SICI)1097-0266(200003)21:3<203::AID-SMJ102>3.0.CO;2-K

Han, S.-K. (1994). Mimetic Isomorphism and Its Effect on the Audit Services Market. *Social Forces*, *73*(2), 29.

Hannah, D. P., & Eisenhardt, K. M. (2018). How firms navigate cooperation and competition in nascent ecosystems. *Strategic Management Journal*, *39*(12), 3163–3192. https://doi.org/10.1002/smj.2750

Hoffmann, W., Lavie, D., Reuer, J. J., & Shipilov, A. (2018). The interplay of competition and cooperation. *Strategic Management Journal*, *39*(12), 3033–3052. https://doi.org/10.1002/smj.2965

Holgersson, M., Baldwin, C. Y., Chesbrough, H., & Bogers, M. L. A. M. (2022). The Forces of Ecosystem Evolution. *California Management Review*, *64*(3), 5–23. https://doi.org/10.1177/00081256221086038

Jääskeläinen, A., Yanatma, S., & Ritala, P. (2021). How Does an Incumbent News Media Organization Become a Platform? Employing Intra-Firm Synergies to Launch the Platform Business Model in a News Agency. *Journalism Studies*, *22*(15), 2061–2081.

Jacobides, M. G., Cennamo, C., & Gawer, A. (2018). Towards a theory of ecosystems. *Strategic Management Journal*, *39*(8), 2255–2276. https://doi.org/10.1002/smj.2904

Jacobides, M. G., Cennamo, C., & Gawer, A. (2024). Externalities and complementarities in platforms and ecosystems: From structural solutions to endogenous failures. *Research Policy*, *53*(1), 104906. https://doi.org/10.1016/j.respol.2023.104906

Jick, T. D. (1979). Mixing Qualitative and Quantitative Methods: Triangulation in Action. *Administrative Science Quarterly*, *24*(4), 602–611. https://doi.org/10.2307/2392366

Johnson, D., Bock, A. J., & George, G. (2019). Entrepreneurial dynamism and the built environment in the evolution of university entrepreneurial ecosystems. *Industrial and Corporate Change*, *28*(4), 941–959. https://doi.org/10.1093/icc/dtz034

Jones, S. L., Leiponen, A., & Vasudeva, G. (2021). The evolution of cooperation in the face of conflict: Evidence from the innovation ecosystem for mobile telecom standards development. *Strategic Management Journal*, *42*(4), 710–740. https://doi.org/10.1002/smj.3244

Kapoor, R. (2013). Collaborating with Complementors: What Do Firms Do? In R. Adner, J. E. Oxley, & B. S. Silverman (Eds.), *Collaboration and Competition in Business Ecosystems (Advances in Strategic Management)* (Vol. 30). Emerald Group Publishing Limited. http://ebookcentral.proquest.com/lib/sdub/detail.action?docID=1335890

Kapoor, R. (2018). Ecosystems: Broadening the locus of value creation. *Journal of Organization Design*, *7*(1), 12. https://doi.org/10.1186/s41469-018-0035-4

Kretschmer, T., Leiponen, A., Schilling, M., & Vasudeva, G. (2022). Platform ecosystems as meta-organizations: Implications for platform strategies. *Strategic Management Journal*, *43*(3), 405–424. https://doi.org/10.1002/smj.3250

Madhavan, R., Koka, B. R., & Prescott, J. E. (1998). Networks in transition: How industry events (re)shape interfirm relationships. *Strategic Management Journal*, *19*(5), 439–459. https://doi.org/10.1002/(SICI)1097-0266(199805)19:5<439::AID-DIA952>3.0.CO;2-2

McIntyre, D., & Srinivasan, A. (2017). Networks, platforms, and strategy: Emerging views and next steps. *Strategic Management Journal*, *38*(1), 141–160. https://doi.org/10.1002/smj.2596

Meyer, T., Kerkhof, A., Cennamo, C., & Kretschmer, T. (2024). Competing for attention on digital platforms: The case of news outlets. *Strategic Management Journal*. https://doi.org/10.1002/smj.3600

Page, L. (2001). *METHOD FOR NODE RANKING INA LINKED DATABASE* (United States Patent Patent US 6,285,999 B1). https://patentimages.storage.googleapis.com/37/a9/18/d7c46ea42c4b05/US6285999.pdf

Podolny, J. M. (1993). A Status-Based Model of Market Competition. *American Journal of Sociology*, *98*(4), 829–872. https://doi.org/10.1086/230091

Podolny, J. M. (1994). Market Uncertainty and the Social Character of Economic Exchange. *Administrative Science Quarterly*, *39*(3), 458–483. https://doi.org/10.2307/2393299

Podolny, J. M., & Phillips, D. J. (1996). The Dynamics of Organizational Status. *Industrial and Corporate Change*, *5*(2), 453–471. https://doi.org/10.1093/icc/5.2.453

Sanchez, R., Galvin, P., & Bach, N. (2023). How design rules emerge and evolve: A coevolutionary architectural perspective on firm and industry organization. *Industrial and Corporate Change*, *32*(1), 28–46. https://doi.org/10.1093/icc/dtac052

Shipilov, A., & Gawer, A. (2020). Integrating Research on Interorganizational Networks and Ecosystems. *Academy of Management Annals*, *14*(1), 92–121. https://doi.org/10.5465/annals.2018.0121

Shipilov, A., & Li, S. X. (2008). Can you have your Cake and Eat it too? Structural Holes' Influence on Status Accumulation and Market Performance in Collaborative Networks. *Administrative Science Quarterly*, *53*(1), 73–108. https://doi.org/10.2189/asqu.53.1.73

Snihur, Y., Thomas, L. D. W., & Burgelman, R. A. (2018). An Ecosystem-Level Process Model of Business Model Disruption: The Disruptor's Gambit: Business model disruption: The disruptor's gambit. *Journal of Management Studies*, *55*(7), 1278–1316. https://doi.org/10.1111/joms.12343

Spigel, B., & Harrison, R. (2018). Toward a process theory of entrepreneurial ecosystems. *Strategic Entrepreneurship Journal*, *12*(1), 151–168. https://doi.org/10.1002/sej.1268

Stuart, T. E., Hoang, H., & Hybels, R. C. (1999). Interorganizational Endorsements and the Performance of Entrepreneurial Ventures. *Administrative Science Quarterly*, *44*(2), 315–349. https://doi.org/10.2307/2666998

Uzzi, B. (1996). The Sources and Consequences of Embeddedness for the Economic Performance of Organizations: The Network Effect. *American Sociological Review*, *61*(4), 674. https://doi.org/10.2307/2096399

Uzzi, B. (1997). Social Structure and Competition in Interfirm Networks: The Paradox of Embeddedness. *Administrative Science Quarterly*, *42*(1), 35. https://doi.org/10.2307/2393808

Wang, R. D., & Miller, C. D. (2020). Complementors' engagement in an ecosystem: A study of publishers' e-book offerings on Amazon Kindle. *Strategic Management Journal*, *41*(1), 3–26. https://doi.org/10.1002/smj.3076

Washington, M., & Zajac, E. J. (2005). Status Evolution and Competition: Theory and Evidence: Academy of Management Journal. *Academy of Management Journal*, *48*(2), 282–296. https://doi.org/10.5465/AMJ.2005.16928408

Zhang, Y., Li, J., & Tong, T. W. (2022). Platform governance matters: How platform gatekeeping affects knowledge sharing among complementors. *Strategic Management Journal*, *43*(3), 599–626. https://doi.org/10.1002/smj.3191

TABLE 1 Descriptive statistics

		Mean	S.D.	1	2	3	4	5	6	7	8	9	10	11	12
1	BypassingCitations	.19	1.62	1.00											
2	PlatformCitations	135.41	121.43	.07	1.00										
3	BrandTrust	.09	.72	.62	.02	1.00									
4	Type (Daily)	.01	.12	.53	.02	.83	1.00								
5	Type (Online)	.00	.07	.29	.01	.40	-.01	1.00							
6	Type (Industrial)	.00	.05	.05	.02	-.01	-.01	.00	1.00						
7	Type (Niche)	.00	.05	.06	.01	-.01	-.01	.00	.00	1.00					
8	Type (Tabloid)	.00	.03	.05	.01	.15	.00	.00	.00	.00	1.00				
9	Coverage (National)	.02	.15	.58	.03	.84	.75	.44	.31	.29	.21	1.00			
10	PlatformUncertainty	.27	.45	.03	.49	.01	.00	.00	.01	.01	.01	.01	1.00		
11	PlatformExit	.45	.50	.02	-.07	.01	.01	.01	.01	.00	.01	.02	-.56	1.00	
12	PageRankCentrality	.00	.00	.56	-.00	.67	.47	.47	.01	.11	.02	.61	-.01	.02	1.00

Note: N = 1,016,301.

TABLE 2 OLS regressions with *BypassingCitations* as the dependent variable

	M1		**M2**		**M3**		**M4**	
	Coef.	p-val.	Coef.	p-val.	Coef.	p-val.	Coef.	p-val.
Variables of interest								
PlatformUncertainty	0.014	.0054	0.029	.0000	0.344	.0000	0.401	.0000
	(0.005)		(.007)		(0.037)		(0.037)	
PlatformExit			0.024	.0001	0.348	.0000	0.480	.0000
			(0.006)		(0.064)		(0.064)	
Control variables								
Coverage (National)	1.582	.0000	1.580	.0000				
	(.113)		(0.113)					
Type (Daily)					0.684	.0000		
					(0.117)			
Type (Niche)					0.167	.0000		
					(0.023)			
Type (Online)					0.858	.0003		
					(0.238)			
Type (Tabloid)					0.135	.0000		
					(0.033)			
PlatformCitations					0.195	.0000	0.257	.0000
					(0.031)		(0.017)	
BrandTrust							0.452	.0000
							(0.031)	
Intercept	0.016	.0003	0.001	.8617	-0.326	.0808	-2.191	.0000
	(0.004)		(0.004)		(0.187)		(0.155)	
Observations	1016301		1016301		24516		17467	
R^2	.586		.587		.287		.268	

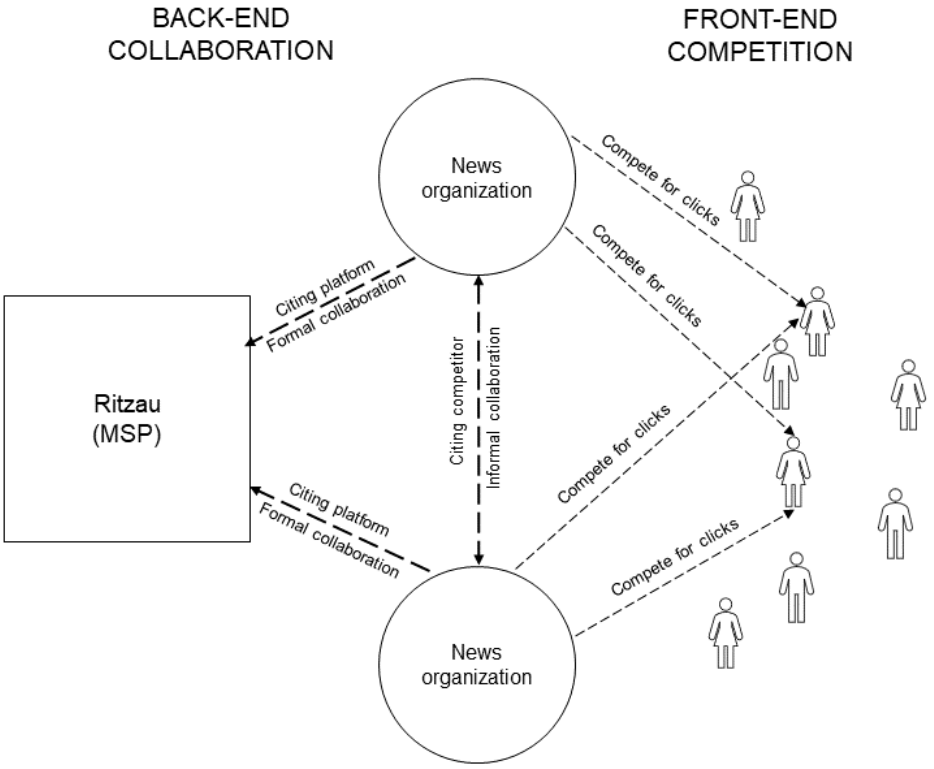
Note: Standard errors (in parantheses) are clustered at the news organization entity level. Differences in observation counts due to limited *Type* and *BrandTrust* data available for several news organizations.

TABLE 3 Beta regressions with *PageRankCentrality* as the dependent variable

	M1		M2		M3	
	Coef.	p-val.	Coef.	p-val.	Coef.	p-val.
Variables of interest						
BrandTrust					0.676	.0011
					(0.207)	
Type (Daily)			0.694	.0000		
			(0.134)			
Type (Niche)			0.326	.1097		
			(0.203)			
Type (Online)			0.268	.1321		
			(0.179)			
Type (Tabloid)			0.038	.4012		
			(0.045)			
Control variables						
PlatformUncertainty	-0.071	.0000	0.162	.0574	0.699	.0008
	(0.013)		(0.089)		(0.208)	
PlatformExit	-0.065	.0000	0.182	.0676	0.743	.0001
	(0.013)		(0.096)		(0.194)	
Coverage (National)	0.179	.0001				
	(0.056)					
Precision	8.428	.0000	7.143	.0000	6.447	.0000
	(0.316)		(0.439)		(0.234)	
Intercept	-5.863	.0000	-5.909	.0000	-8.940	.0000
	(0.007)		(0.070)		(1.161)	
Observations	3730		484		88	
Pseudo-R^2	.075		.336		.565	
Residual std. error	.001		.003		.004	

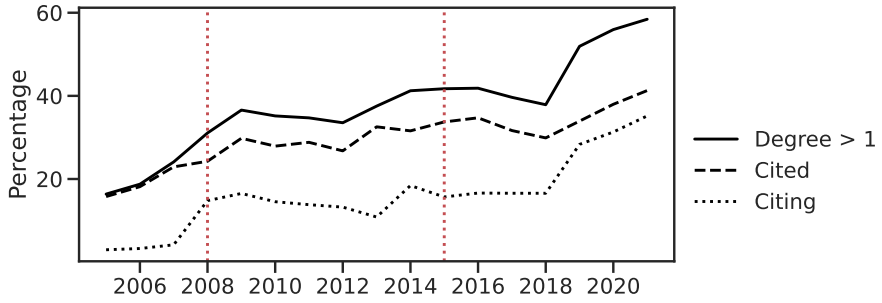
Note: Standard errors (in parentheses) are clustered at the news organization entity level. Differences in observation counts due to limited data availability for *Type* and *BrandTrust*.

FIGURE 1 Relationships in the Danish News Ecosystem



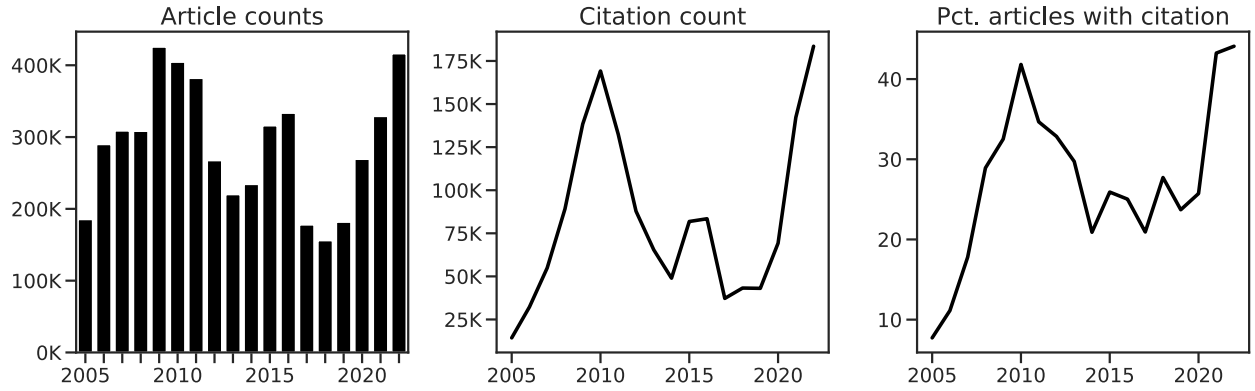
Notes: News organizations engage in both front-end competition (for reader attention and clicks for ad revenue) as well as backend collaboration. The latter entails joint co-ownership of the central MSP (the news agency Ritzau), allowing news organizations to obtain information for use in their articles via citation, i.e., through formal collaboration. Moreover, news organizations can also collaborate informally by citing each other without the need for formal coordination or going through the MSP.

FIGURE 2 Percentage of Citing or Cited News Organizations, 2005-2021



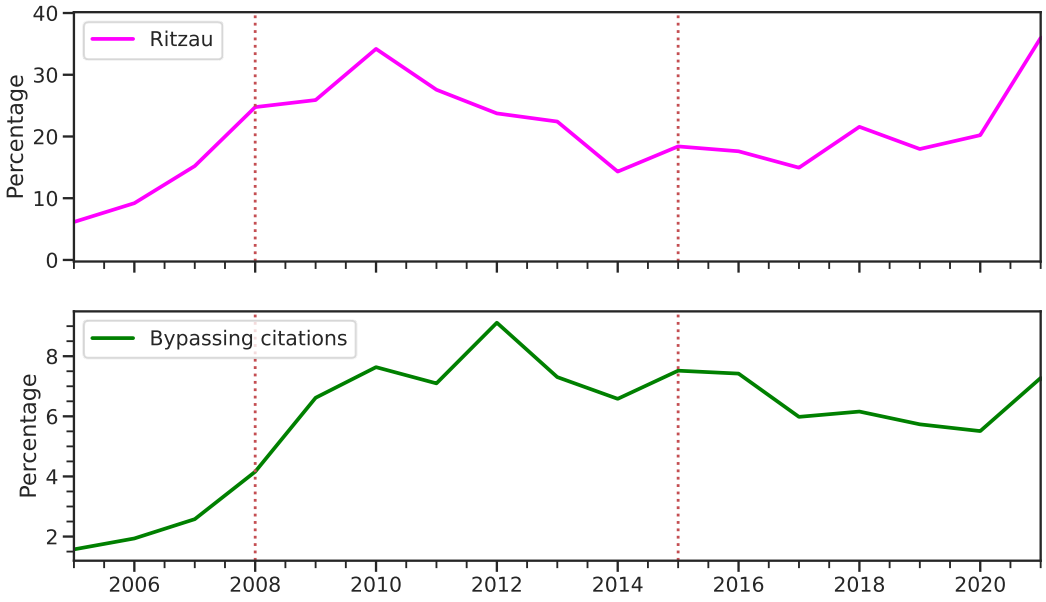
Notes: Percentages of nodes (N_{min} = 336, N_{max} = 345) with a degree score >= 1 in each annual citation network, i.e., nodes that either cite or get cited by another node at least once. "Cited" reports the percentage of nodes with in-degree >= 1, and "Citing" is the percentage of nodes with out-degree >= 1. The red dashed lines indicate the crisis of the MSP (the news agency Ritzau). With the start of the crisis in 2008, we observe an increase in citing and cited nodes in the network, indicating that more news organizations engage in citation practices beyond Ritzau in the face of uncertainty regarding the MSP.

FIGURE 3 News Articles and Citations, 2005-2021



Notes: Left panel: Articles per year (total N = 5,205,236). Middle panel: Citations per year (total N = 1,516,736). Right panel: Percentage of articles within a citation. Article and citation counts increase significantly between 2005 and 2010, before decreasing again until 2014. At the same time, the annual percentage of articles with citations decreases significantly from 2011-2014.

FIGURE 4 Percentage of News Articles Containing a Citation, 2005-2021



Notes: Article $N = 5{,}205{,}236$. Citation $N = 1{,}516{,}736$. The red dashed lines indicate the crisis of the MSP (the news agency Ritzau). We performed a Kruskal-Wallis H test over three periods: before the Ritzau crisis (2005-2008), during the crisis (2008-2015), and after the crisis (2016-2022), and shows significant differences in distributions across the three periods for citations of Ritzau ($H = 33.18$, $p < .0000$) as well as citations that bypass the MSP ($H = 219.21$, $p < .0000$).

FIGURE 5 Example of a Bypassing Citation


TV2

NYHEDER Seneste Folkeafstemning 2022 Coronavirus Politik Krimi Samfun

SAMFUND

Sidney Lee er død

16. maj 2022, 18:55

Sidney Lee på den røde løber ved Reality Awards 2021 på Docken i København. Foto: Martin Sylvest / Ritzau Scanpix

af Mie Haugaard

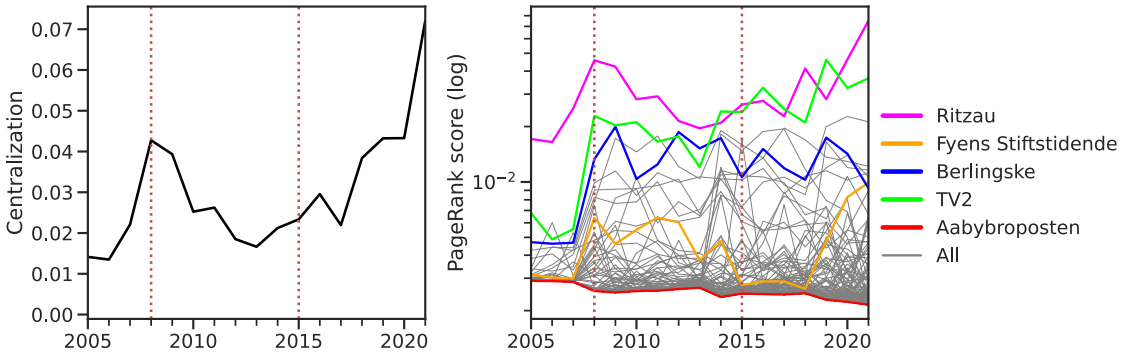
Københavns Politi oplyser til TV 2, at der er indgivet en sag til Den Uafhængige Politiklagemyndighed.

Realitystjernen Sidney Lee er død. Det bekræfter hans familie over for Ekstra Bladet.

- Vi er i stor sorg, fortæller familien til mediet. De ønsker ikke at oplyse yderligere om dødsfaldet.

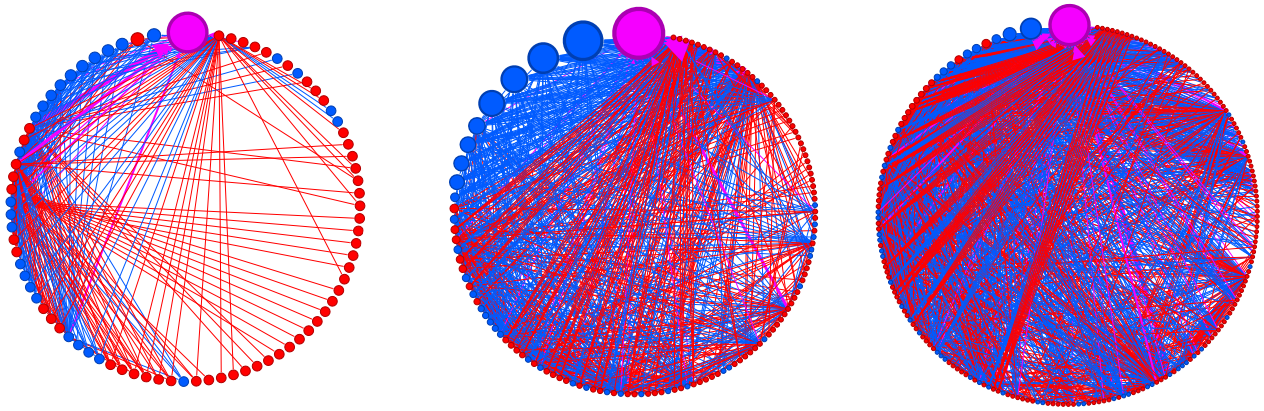
Notes: Citation of a Danish news article (highlighted in yellow) by the news website TV2.dk, August 16th, 2022, referring to a story published by the news media Ekstrabladet.

FIGURE 6 Degree of Centralization in the Danish News Ecosystem, 2005-2021



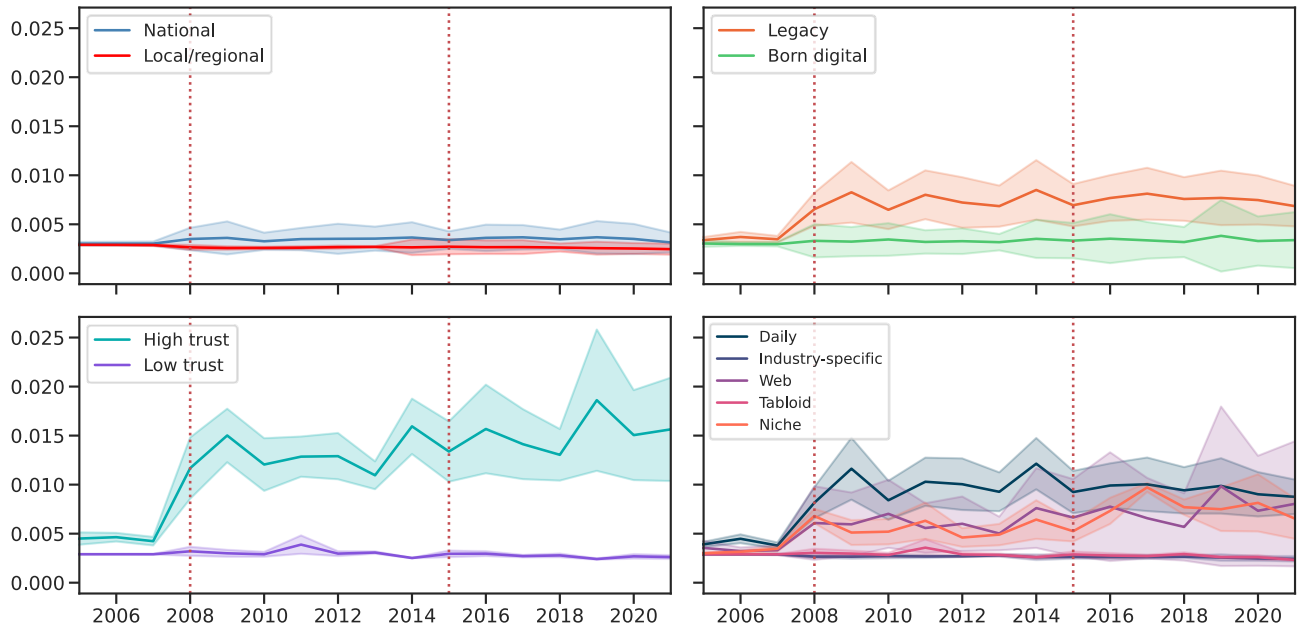
Notes: Left panel: We use the network centralization formula defined by Madhavan et al. (1998) on PageRank centrality scores among all nodes in the given years (N_{min} = 336, N_{max} = 345). The red dashed lines indicate the crisis of the MSP (the news agency Ritzau). At the beginning of the Ritzau crisis (2008), network centralization increases. However, as news organizations adapt to the uncertainty of the crisis and begin using bypassing citations, we observe a decentralization of the ecosystem, as the centralization measure decreases from 2010 and three years onwards. After the Ritzau crisis (2016), centralization increases once again and more rapidly compared to before. Right panel: Log distribution of PageRank scores of each node over time with example organizations highlighted in color. Notably, Ritzau's centrality has a strong positive linear correlation with network centralization (Pearson's $r(20) = .97$, $p < .0000$), suggesting that its crisis and loss of centrality impact the overall ecosystem structure. We also observe that the PageRank centrality of a few other nodes increases (e.g., TV2 and Berlingske).

FIGURE 7 Citation Network Visualization in 2007 (left), 2013 (middle), and 2021 (right)



Notes: Only nodes with a degree score >=1 are visualized, hence the differences in the number of nodes shown. Nodes are colored by type (blue = national organization, red = local organization, purple = Ritzau), while node size reflects PageRank scores (bigger is higher). Networks are ordered counterclockwise by node PR score (low to high). In the case of ties in PageRank scores, the order within the tie group is random. Edges are weighted by citation count (thickness), while edge color denote target type. We observe that Ritzau, despite achieving the highest PR score across all three years, becomes less central in 2013 compared to 2007, as more nodes are connected in the network independent of Ritzau. These ties arise in part due to bypassing citations. The networks become more decentralized as citations are more dispersed throughout the network. Ritzau returns to a very central position in 2021, although ties between other nodes are still present.

FIGURE 8 Mean PageRank Scores within Organization Type Samples, 2005-2021



Notes: The red dashed lines indicate the crisis of the MSP (the news agency Ritzau). National = national news coverage. Local/regional = local/regional news coverage. Legacy = "traditional" national newspaper before digitalization. Born digital = national media organization founded after digitalization (web only). High trust = over 5 in reported trust from 2022 survey (respondent N = 1,337). Low trust = below 5 in 2022 survey (respondent N = 1,337). Daily = national daily newspapers ("legacy media"). Industry-specific = nationals covering only one industry/topic. Web = national news organizations with an online presence only. Tabloid = national web/physical newspapers on celebrities and entertainment. Niche = national "niche" web/physical newspapers.