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Digital platform-based ecosystems: The evolution of collaboration and competition between incumbent producers and entrant platforms

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ABSTRACT

The rise of the Internet has seen traditional incumbent producers challenged by competition from digital entrant platforms. It is unclear, however, how those two types of actors—which are in competition but also mutually dependent—can co-exist in the new platform-based ecosystem. This paper sheds light on that pivotal phenomenon by connecting the traditional literature on incumbent adaptation with the growing conversation on digital platform-based ecosystems. Through a qualitative longitudinal (2005–2019) study of the global digital advertising ecosystem, we examine how incumbent producers pivot between competitive and cooperative strategies in response to digital entrant platforms. Our analysis reveals a process characterized by three sequential phases: (1) selective cooperation, (2) allied competition, and (3) selective co-competition. Those phases show how switching between different multi-level strategies spanning market segments, products, and technological components represents a viable solution for incumbent producers adapting in the face of entrant platforms.

1. Introduction

Platform-based businesses, such as media, marketplaces, video games, and credit cards, increasingly represent an important part of modern economies (e.g., Parker & Van Alstyne, 2005; Zhu & Iansiti, 2012). Their relevance today has become even more critical with the creation of digital platform-based ecosystems following the advent of digital giants such as Google, Amazon, and Apple. A “platform-based ecosystem” is defined here as a network where a platform owner encourages third parties to develop complementary innovations and the resulting network of firms manifests significant interdependencies (Ceccagnoli, Forman, Huang, & Wu, 2012; Gawer & Cusumano, 2008; Parida, Burström, Visnjic, & Wincent, 2019). In the online space, this phenomenon is particularly critical as it leads incumbents into dealing with fierce competitors—digital entrant platforms—with whom they need to develop complementarities and strategic interdependencies (e.g., Adner & Kapoor, 2010; Cusumano, Gawer, & Yoffie, 2019). One of the outcomes in a digital platform-based ecosystem is often that the competitive position of the complementors (often independent producers) becomes weaker relative to the platform owner controlling the ecosystem (Gawer & Cusumano, 2002). The power of Apple over its app

developers (Yoffie & Rossano, 2012) and that of Amazon over its complementors (Aversa, Haefliger, Hueller, & Reza, 2020; Zhu & Liu, 2018) are two notable examples.

While research on platform-based ecosystems is considerably developed in information systems research (e.g., de Reuver, Sorensen, & Basole, 2018; Huber, Kude, & Dibbern, 2017; Tiwana, Konsynski, & Bush, 2010; Tiwana, 2015) and increasingly so in strategic management research (e.g., Adner, 2017; Boudreau, 2010; Gawer & Cusumano, 2008; Jacobides, Cennamo, & Gawer, 2018), we lack a clear understanding of how incumbents that started as non-digital platforms adapt to similar ecosystems. That gap is due to the literature on incumbent adaptation to technological changes historically studying how traditional incumbents (non-platform and non-digital) adapt to non-platform-based radical technologies. For example, studies on technological discontinuities (Tushman & Anderson, 1986) have examined how traditional producers of cement, glass, and airplanes (Anderson & Tushman, 1990), but also pharmaceutical companies (e.g., Sosa, 2011), have struggled to adapt to (non-platform) radical innovations causing competence destruction. Similarly, studies on disruptive innovations (Christensen & Bower, 1996) have tended to consider the disruption of traditional incumbents such as steel producers or disk drive manufacturers (Christensen, 1997)

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or photo camera manufacturers (Tripsas & Gavetti, 2000) by (non-platform) disruptive entrants making products cheaper and more accessible. Incumbent adaptation to digital entrant platforms is a relevant problem for practitioners, as shown by leading incumbents failing to survive, such as Nokia's demise when Apple and Google created a new digital platform-based ecosystem for mobiles (Vuori & Huy, 2016). Due to the theoretical and practical relevance of this gap, we investigate how incumbent producers (that are non-digital platforms before the technological change) can respond to entrant platforms by shifting their competitive and cooperative position, and can ultimately adapt to the emerging digital platform-based ecosystems. We specifically focus on incumbent producers because, of the four main actors in a platform ecosystem (platform owners, producers, providers, consumers—according to Parker, Van Alstyne, & Choudary, 2016) incumbent producers are key for a platform-based ecosystem as they often experience issues and frictions when adapting to such new scenarios.

The few studies related to our focal phenomenon of incumbent producers' adaptation to entrant platforms showed that incumbents might need to deploy specific strategies in those new ecosystems. Scholars have noted that incumbents often cooperate and compete with competitors in the new digital ecosystems (Ansari, Garud, & Kumaraswamy, 2016; Cozzolino & Rothaermel, 2018; Cozzolino, Verona, & Rothaermel, 2018; Hannah & Eisenhardt, 2018). The main reason is that incumbent producers may need to cooperate with digital entrant platforms to access advanced digital technologies and solutions which can be useful, for example, for distributing their products (see the relationship between producers of electronics and Amazon or eBay, hotel chains with Booking.com and Expedia, or smartphone producers with Android, for example). Yet, entrant platforms usually offer products and services which are competitors or substitutes to the incumbents' offering. That means that incumbents start losing market share and see their ability to capture value diminish, with the overall effect of pushing them into also competing with the entrant platforms. Despite the phenomenon's pervasiveness in modern economies and the rising interest among academics, we still lack a clear understanding of how those firms jointly pivot the cooperative and competitive strategies over time (Hoffmann, Lavie, Reuer, & Shipilov, 2018). Developing such insight is a non-trivial challenge because competitive responses may span products, technologies, and market segments. Furthermore, we have scant understanding of how traditional (i.e., non-digital) platforms, that is, companies which connected diverse consumer groups in a non-digital world, such as a media publisher connecting readers and advertisers, compete and cooperate with digital entrant platforms (e.g., Google).

To advance our understanding, we investigate how incumbent producers engage with entrant platforms and, over time, adjust their relationships with them as the digital ecosystem evolves. Examining intra- and inter-industry cooperation among entrant platforms and incumbent producers is of paramount importance, especially because there are still numerous industries where, despite the profound digital transformation, the impact of digital change has not been sufficiently explored (e.g., Nucciarelli et al., 2017). Our paper thus asks: *How do incumbent producers progressively adapt competitive and cooperative positions in response to entrant platforms in increasingly digital ecosystems?*

We investigate that question through a longitudinal study of the global digital advertising ecosystem between 2005 and 2019. Within that setting, we take the perspective of the incumbent producers (i.e., media publishers offering advertising space) and examine their strategies with respect to new entrant platforms (i.e., technological platforms commercializing online advertising such as Google and Facebook). Such entrant platforms have significantly altered the process of how advertising is traded, and overhauled the structure of the traditional industry, by transforming it into a digital platform-based ecosystem. The phenomenon is particularly important because the financial performance of incumbent producers has been severely affected by digital entrant platforms controlling the new advertising ecosystem (Digiday, 2014; The Economist, 2017).

Our central contribution is the identification of a grounded process revealing three sequential phases through which incumbent producers embrace the relationship with entrant platforms over time: selective cooperation, allied competition, and selective cooperation. By unpacking the evolution of those three specific strategies, our study shows that incumbent producers' responses to entrant platforms require a dynamic adaptation through different forms of competition and cooperation, sometimes also spanning multiple levels (e.g., high-end versus low-end; products versus technological components) in the digital ecosystems. Overall, this research contributes to multiple literatures, including incumbent adaptation, platform-based ecosystems, and competition-cooperation.

2. Theoretical background

Two major streams of literature have developed separately over the years, although the recent digital transformations have seen increasing calls for their convergence. The first stream on incumbent adaptation to technological changes has examined when and how incumbents struggle or adapt to various types of change (e.g., Anderson & Tushman, 1990; Cozzolino & Rothaermel, 2018; Henderson & Clark, 1990). The second stream on platforms has instead examined the strategies and business models of platform-based organizations in industries and ecosystems (e.g., Aversa, Hervás-Drane, & Evenou, 2019; Gawer & Cusumano, 2014; Jacobides et al., 2018; Parida et al., 2019). Each of those research traditions has developed from different theoretical perspectives. For example, incumbent adaptation studies have been conducted by scholars concerned with organizational competences (e.g., Teece, Pisano, & Shuen, 1997), managerial cognition (e.g., Tripsas & Gavetti, 2000), and strategic alliances (e.g., Pisano, 1990). Platform studies have been conducted in fields such as network economics (e.g., Rochet & Tirole, 2003), information systems research (e.g., Huber et al., 2017; Tiwana et al., 2010), strategy (e.g., Cennamo & Santalo, 2013; Parida et al., 2019), and innovation (e.g., Boudreau, 2010; Nucciarelli et al., 2017).

2.1. Incumbent adaptation to technological changes

The incumbent adaptation stream has traditionally examined how the nature of technological changes affect the competitive advantage of incumbents. Incumbents are defined as companies that existed in the industry prior to a discontinuous change in technology (Sosa, 2013). The term discontinuity refers to a change that is so significant that the improvements of the previous technology cannot match the performance of the new technology (Anderson & Tushman, 1990). That research stream has unveiled important typologies of change, such as competence-destroying discontinuities (Tushman & Anderson, 1986), architectural and modular innovations (Henderson & Clark, 1990), disruptive innovations (Christensen & Bower, 1996), complementary-asset discontinuities (Cozzolino & Rothaermel, 2018), and regulatory changes (Aversa & Guillotin, 2018). A common finding has been that incumbents often fail or struggle after discontinuous changes, with the competitive advantage shifting in favor of entrants. Such entrants are defined as companies that were not operating in the market before the discontinuity and are often responsible for introducing the discontinuity to the market.

It is important to observe that most of that research stream's findings have emerged by examining industrial settings and technologies that are non-platform-based and non-ecosystem-based. For example, common technological settings used in this stream have been cement and airlines (Tushman & Anderson, 1986), disk drives (Christensen & Bower, 1996), flat-panel displays (Eggers, 2012), typesetters (Tripsas, 1997), and cars (Aversa & Guillotin, 2018; Marino, Aversa, Mesquita, & Anand, 2015). As none of those settings was platform-based or ecosystem-based, there is an opportunity to expand our understanding. It is notable that the distinction between traditional industries and platform ecosystems does

not merely pertain to a difference of setting or domain. Rather, it involves fundamental aspects which question the nature and outcomes of competition. For example, the heterogeneous set of actors involved in ecosystems (Adner, 2017; Jacobides et al., 2018), often spanning multiple industries, tend to reshape the competition by introducing different goals, supply chains, and value propositions. Platforms then introduce new mechanisms to the competition—such as increasing returns of adoption via indirect network effects (Shipilov & Gawer, 2020)—which fuel competition dynamics that are less common in non-platform settings. Despite the increasing importance of platform-based ecosystems, the technological change stream provides a far from complete understanding of such matters. Our paper thus aims to contribute to this area of investigation by assessing how incumbent producers adapt to entrant platforms with the emergence of digital platform-based ecosystems. That question is also relevant from a practical perspective because most of the technological changes occurring today with the advent of the Internet are platform- and ecosystem-based. The fact that discontinuity is introduced by an entrant platform is a new phenomenon, to which incumbents need to react differently. Responding to entrant platforms may require adopting different organizational identities (Altman & Tripsas, 2015) or business models (Cozzolino et al., 2018). Moreover, it might require dynamic use of competitive and cooperative strategies, which are the focus of this study.

2.2. Platform-based ecosystems, competition, and cooperation

The research stream on platforms and ecosystems has examined the strategies and business model configurations of platform companies and the interconnected systems around them (see Shipilov & Gawer, 2020 for a review). In our paper, a platform is an entity that enables transactions between multiple actors in the presence of network externalities—a condition where the marginal value of a part increases with the addition of other parts. Network economists and information systems researchers have explained that the business model adopted by platforms is often that of matching two or more markets (namely, two-sided or multiple-sided platforms) with the aim of internalizing the network externalities within and across markets (Parker & Van Alstyne, 2005; Rochet & Tirole, 2003). The examined research stream, especially from the strategy and information systems perspectives, has shown that platforms often become prominent players in industries as a consequence of their role as orchestrators of multiple parties (Gawer & Cusumano, 2008; Parida et al., 2019; Tiwana, 2015). The industries where platforms become central actors tend to assume the form of business ecosystems. In general, a business ecosystem is a space of mutual complementarities and interdependencies where a focal firm operates, and it usually includes suppliers, customers, competitors, and complementors from various industries (e.g., Adner & Kapoor, 2010; Moore, 1993).

A platform-based business ecosystem, in particular, is a business ecosystem where the central actor is a platform, so it is characterized by network externalities and platform strategies (e.g., Iansiti & Levien, 2004; Van Alstyne, Parker, & Choudary, 2016). According to Van Alstyne et al. (2016, p.4), a platform-based ecosystem comprises four players: the *platform owner* controlling intellectual property and governance, the *providers* acting as the platform's interfaces with users, the *producers* creating the offers, and the *consumers* adopting the products and services. That basic structure is useful for our paper because our research question pertains precisely to how incumbent producers deal with platform owners in an emerging ecosystem. When such a platform-based ecosystem is mostly based on internet-based and/or data-driven technologies, it can be considered “digital” (i.e., a digital platform-based ecosystem; Helfat & Raubitschek, 2018; Nambisan & Baron, 2019).

That research stream has also shown cooperation and competition to be critical aspects of platform ecosystems. As Adner (2017, p. 40) suggests, an ecosystem has a “multilateral set of partners that need to

interact in order for a focal value proposition to materialize.” That suggests the need for cooperation with and among several providers and producers to create value. The platform owner is often pressured to work collectively with a set of complementors to have them develop complementary innovations that synergically increase the overall value of its platform, as well as that of its partners (Gawer & Cusumano, 2008). Gawer (2014) also indicates that, as an industry ecosystem emerges, cooperative innovations occur on a platform, with concurrent competition increases from complementors desiring to create their proprietary platforms. Similarly, ecosystem members can cooperate to create value jointly, but also attempt to become platforms and compete (Cowen & Gawer, 2012). Platforms need to balance carefully business and technology decisions, as entering complementors' markets can hinder complementors' motivation to innovate, thereby resulting in “excessive” competition (Zhu & Liu, 2018). Therefore, the governance of platforms is a key issue (Huber et al., 2017), as they need to control which features to compete on while allowing other players to create complementary features that increase platform functionality and value (Parker & Van Alstyne, 2018).

2.3. Remaining theoretical gaps at the intersection of incumbent adaptation and platform ecosystems

The literature on incumbent adaptation to technological changes and the platform ecosystem research streams have advanced important and insightful contributions, but they have clearly adopted different perspectives and examined somewhat different phenomena. On the one hand, the incumbent adaptation stream has taken the perspective of established (non-platform) organizations while mostly neglecting the consideration of entrant platforms and digital platform-based ecosystems. Hence, we aim to extend the study of incumbent adaptation to the phenomenon of platform-based discontinuities/disruptions. On the other hand, the platform ecosystem stream has taken the platform owner perspective, although ecosystem development also requires considering the perspective of incumbent producers as complementors. Therefore, we aim to extend the understanding of platform-based ecosystems beyond the platform owner perspective by integrating the view of incumbent producers.

Given that competition and cooperation in platform-based ecosystems is crucial, we can expect that non-platform incumbents also need to cooperate and compete in similar digital ecosystems. However, we ignore the specifics of how that can unfold. Understanding that problem is important because the literature has recently called for contributions to shed light on this phenomenon (Helfat & Raubitschek, 2018; Teece, 2018). Cozzolino and Rothaermel (2018) have started to conceptualize competition and cooperation between incumbents and new entrants when technological discontinuities destroy incumbents' complementary assets (i.e., manufacturing, distribution, and sales). Digital distributive platforms represent new complementary assets for incumbent producers such as movie and music producers and publishers to commercialize their products online. Those authors suggest that, when a discontinuity introduces new complementary assets, incumbents can cooperate among themselves against the entrants which own the new complementary assets to avoid excessive expropriation of value by those entrants, especially when the appropriability regime is weak.¹ When the appropriability regime is strong, incumbents may afford a higher degree of cooperation with those entrants because the incumbents' intellectual property is protected by the stronger regime. Incumbents might also use cooperation among themselves to increase their collective bargaining

¹ Teece (1986, 1989, 2018) originally introduced the concept of appropriability regimes to refer to the legal and non-legal mechanisms that permit intellectual property protection. The author also introduced the concept of complementary assets as those assets allowing the commercialization of products, thus practically enabling value capture.

power against entrants. Hannah and Eisenhardt (2018) complement this view by pointing out that competition and cooperation dynamics in emerging ecosystems depend on bottleneck crowdedness. Further, Padula and Dagnino (2007) explain that a high environmental uncertainty and distance in the knowledge profile generates competitive tensions within a cooperative context. Similar competitive tensions have been observed in the case of incumbent producers commercializing their products through Amazon’s online platform (Aversa et al., 2020). Among others, Hoffmann et al. (2018) call for additional research on the evolution of competition and cooperation from different contexts, and our study is aimed at responding to that call from the overlooked perspective of incumbent producers adapting to entrant platforms in digital platform-based ecosystems.

3. Methods

We conducted an inductive longitudinal study on the evolution of the digital advertising ecosystem with particular attention to the interplay between incumbent producers (traditional publishers commercializing advertising space on their media websites) and entrant platforms (technological entrants trading digital advertising). The extensive use of archival data is particularly suitable when the goal is to provide a contextualized explanation and interpretation of the phenomenon under study by leveraging the historical contextual conditions as a key component of the empirical analysis (see reflections in Argyres et al., 2020). We selected the advertising industry because, despite being a long-established industry, it has been radically overhauled by digital technologies such as the Internet, big data analytics, portable devices, and social media (Athey & Gans, 2010; Cozzolino et al., 2018; Lanzolla & Giudici, 2017; Simmons, Palmer, & Truong, 2013). The way modern advertising is transacted, sold, and purchased is radically different from the approach at its inception in the 17th century and, indeed, the early 19th century, when it underwent massive growth in conjunction with the development of the modern printing industry. More recent radical shifts, which are mostly due to digital transformation, make the industry a digital platform-based ecosystem, and thus an ideal setting for a response to our research question.

Before the advent of the Internet, the advertising industry was comprised of actors such as traditional incumbent producers (i.e., media owners), including newspapers, radio, television (operating as sellers of advertising space), advertisers, agencies representing advertisers (operating as buyers of advertising space), and firms measuring and rating the audience (e.g., Nielsen Media Research, the Audit Bureau of Circulation). The Internet has challenged the incumbent producers’ competitive advantage by becoming an alternative medium for effective advertising, in which entrant platforms enable personalized and performance-based advertising (Bergemann & Bonatti, 2011). Online advertising has resulted in the creation of a new ecosystem incorporating existing and new actors, such as advertisers, agencies, the new entrant platforms, including the ad networks and exchanges which are the main focus of our analysis but also trading desks, demand-side platforms, supply-side platforms, and incumbent publishers (Fig. 1

provides a simplified representation of the digital advertising ecosystem).

During the evolution of the new digital ecosystem, new entrant platforms trading advertising spaces emerged, while incumbent producers responded through competitive and cooperative strategies. The study of that pivotal transformation has allowed us to identify a general process through which both incumbent producers and entrant platforms compete and cooperate in an emerging digital ecosystem.

3.1. Data sources

Our research is based on an extensive collection of archival and interview data. Given the retrospective and longitudinal nature of our study, which covers a relatively significant span of years (2005–2019), archival data were used as the main source of information. The use of secondary archival data presents several advantages for research. First, published records in the form of archival data represent more factual and objective sources of information than primary sources such as interviews, which might be more subject to the risk of ex-post rationalization by key informants (e.g., Vuori & Huy, 2016). A second advantage is that archival data provide better and richer contextual information on the period observed than interview data (e.g., Galvin, Burton, & Nyuur, 2020). Accordingly, archival data are viable sources for empirical analysis and have been employed widely in management research (e.g., Cattani, Ferriani, & Lanza, 2017; Galvin et al., 2020). The archival data collection process involved the examination of the digital advertising industry through publicly available resources between 2005 (the introduction of the first disruptive platform entrant) and 2019. We began our search by inspecting specialist media outlets such as *Ad Age*, *Adweek*, and *Digiday*. Advertising and media professionals consider those sources to be the most reliable and established. Our search criterion included industry- and phenomenon-related keywords such as “audience buying,” “ad networks,” “ad exchanges,” “private marketplaces,” “digital media,” “ad tech vendors,” and “inventory.” We integrated the information obtained from those sources with videos and reports obtained from specialist conferences and the Interactive Advertising Bureau (IAB).

In addition to the specialist data sources, we collected archival data from the generalist press. Each author undertook independent data collection, with the final results combined and discussed within the research team. We scanned the Lexis-Nexis database for articles between the years 2000 and 2019. We used different combinations of key terms such as “advertising,” “remnant,” “programmatic,” “bidding,” “publisher,” and “alliance” as the main keywords and initially retained all documents mentioning at least one keyword. For example, an initial search of “advertising,” “programmatic,” and “publisher” yielded 403 results. However, in order to take into account more recent industry developments, we added keywords such as “bidding” or “alliance” in a nested fashion to generate 129 and 28 results, respectively. While the search included significant international publications such as the *Financial Times* and *The New York Times*, other English language publications from outside the United Kingdom and the United States were

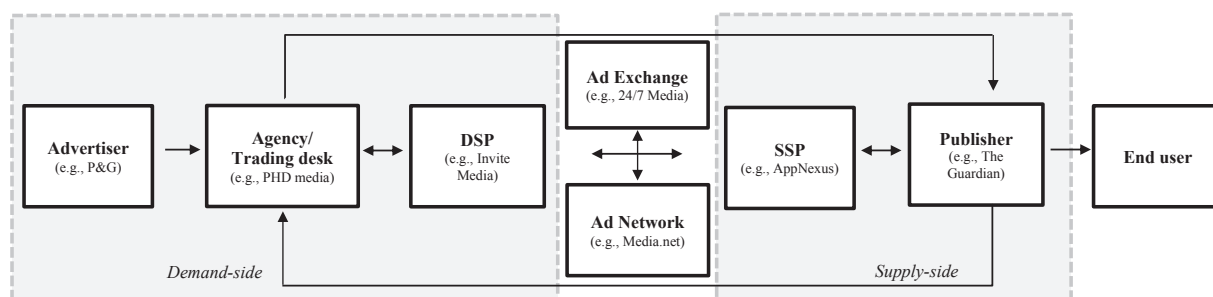


Fig. 1. The digital advertising ecosystem.

Table 1
Data sources.

Data Sources	Type of data	Use in the analysis
Interview data	10 Interviews conducted with industry executives and subject experts (12 h duration, 21 pages of transcripts)	Gathering insights on the effect of technological disruption on the advertising industry as well as the drivers of cooperation and competition between incumbent publishers and new entrants
Archival data	<p>Videos downloaded from the internet</p> <p>2 Interactive Advertising Bureau (IAB) videos about the evolution of online display advertising</p> <p>Journal articles</p> <p>7 articles covering the period 2008–2012 (160 pages)</p> <p>Press coverage</p> <p>50 articles covering the period 2005–2019 (133 pages)</p> <p>Reports</p> <p>6 reports covering the period 2011–2017 (174 pages).</p>	<p>Gaining an initial understanding of the online advertising buying process (e.g., how the audience buying evolved from traditional buying towards sophisticated programmatic buying)</p> <p>Developing knowledge about the key elements involved in advertising such as pay-per-exposure, pay-per-action, targeting, and re-targeting.</p> <p>Further understanding the role of aggregators in the news and advertising industry and the threats and opportunities they pose for publishers</p> <p>Expanding the factual information about the phases involved in buying and selling of ad spaces. Better understanding the emergence of each, their respective workflow, and the type of ad space (remnant/premium)</p> <p>Enhancing the validity of insights, better understanding the phenomena of advertising and audience buying from the scope of industry experts and where it is headed</p>
Total	73(+2) documents (490 pages ca.)	

also taken into account. From that list, we selected articles related to the effects of advertising industry digitalization, the role of new entrants in shaping that industry, and the reactions of advertisers and publishers. We also collected academic articles on the topic, primarily within the marketing field, to understand further the various technologies and models for the algorithmic exchange of advertisements online. Such publications often dealt with new pricing models (pay-per-exposure and pay-per-action), targeting methods, the role of news aggregators such as Google and Facebook, and their economic impact on publishers' advertising revenues. In line with recent qualitative research mostly based on archival data (e.g., *Aversa & Guillotin, 2018*), the initial body of documents was skimmed for relevance, information and source reliability, and repetition. That process ultimately led to a final selection of 63 documents with a total of 469 single-spaced pages of relevant text.

In addition to the archival sources, ten explorative semi-structured interviews were conducted with industry experts and executives from both incumbent producers and entrant platforms (*Corbetta, 2003*). The primary and secondary data collection was terminated once it reached "theoretical saturation" (*Glaser & Strauss, 1967*), which corresponds to the scholars realizing that additional data no longer spark new theoretical insights nor reveal new properties of the theoretical categories (*Charmaz, 2006, p. 113*). To identify our interviewees, we initially relied on personal industry contacts of an author who had previously worked in a media company. We then expanded through a snowball technique via interviewees' referrals, as well as through independent LinkedIn searches. To provide consistency in interview style and protocol, only one of the authors conducted the interviews. Interviews were open-ended (e.g., *Eisenhardt & Bourgeois, 1988*; *McDonald & Eisenhardt,*

2020) and aimed at understanding the key events shaping a new ecosystem and incumbent-entrant dynamics. Each interview opened with the interviewer broadly inquiring about the interviewee's background, then their company's business and core competencies.

The second part of the interview consisted of open questions about more specific topics such as the evolution of advertising and the role of incumbent producers' reactions to entrant platforms. Notes were taken during and after the interviews. To ensure reliability, multiple researchers analyzed the interviews independently, with discrepancies and agreements in the individual coding being discussed. Interviews lasted from 45 to 120 minutes, were transcribed verbatim, and then checked for accuracy. Overall, we collected 12 hours of personal interview material. The combination of a large quantity of archival data from a variety of sources and interviews with key industry experts enabled us to triangulate our data and develop our framework (*Neuman, 2003*). *Table 1* provides a detailed overview of our data sources.

3.2. Data analysis

Given the novelty of the observed phenomenon, we started by constructing a chronology of events illustrating the evolution of the advertising market and the emergence of a digital ecosystem since 2005 (see *Fig. 2*). The presented timeline helps to illustrate the three phases where each period is demarcated by distinct patterns of collaboration and competition among incumbents and entrants that are observable in a fairly stable and linear manner (*Langley, 1999*). We tracked how digital advertising was purchased and sold over time, identifying major transitions and industry players in the digital advertising landscape (e.g., advertisers, media agencies, newspaper publishers, and ad tech companies).

We then focused on identifying the mechanisms behind the ecosystem evolution and the challenges incumbents faced with each technological advancement. To conduct a more fine-grained analysis, we continuously compared data from various sources with our emerging theoretical insights (*Glaser & Strauss, 1967*). The analysis followed the general principles of grounded theory (*Locke, 2001*), with our coding procedure generating first-order concepts, second-order themes, and aggregate dimensions (e.g., *Corley & Gioia, 2004*). To organize the material, we adopted a manual coding procedure, which gives researchers "more control over and ownership of the work" (*Saldaña, 2015, p. 26*). We also followed a "temporal bracketing" procedure (*Langley, 1999*) to identify a longitudinal, theoretically relevant, process. As with every qualitative study, our analyses were dynamic and iterative—often referring back to data and theory to validate our findings.

Step 1: Creating first-order concepts. Each author conducted an analysis of the interview and archival material to identify the key emerging themes, discuss them, and agree on representative labels. Open codes in our data included statements concerning incumbent producers recognizing "reach and efficiency as selling points" of ad-network platforms, incumbent producers competing against entrant platforms by "getting together and making an alliance", and incumbent producers partnering with entrant platforms to "more effectively and efficiently manage and evaluate data." Redundancies were consolidated, with the codes gradually forming fifteen first-order categories (*Gioia, Corley, & Hamilton, 2013*).

Step 2: Progressing toward second-order themes. Next, we gradually progressed toward theory-driven explanations (*Strauss & Corbin, 1990*) by searching for links between the fifteen first-order concepts to facilitate grouping them together into seven abstract second-order categories. Following the *Van Maanen (1979)* approach, one of the scholars tried to challenge the interpretation of the second-order themes to improve theorizing. Coding and interpretations which did not find agreement across the coders were ultimately discarded.

Step 3: Generating aggregate dimensions. This final step entailed aggregating similar themes into three overarching dimensions, which

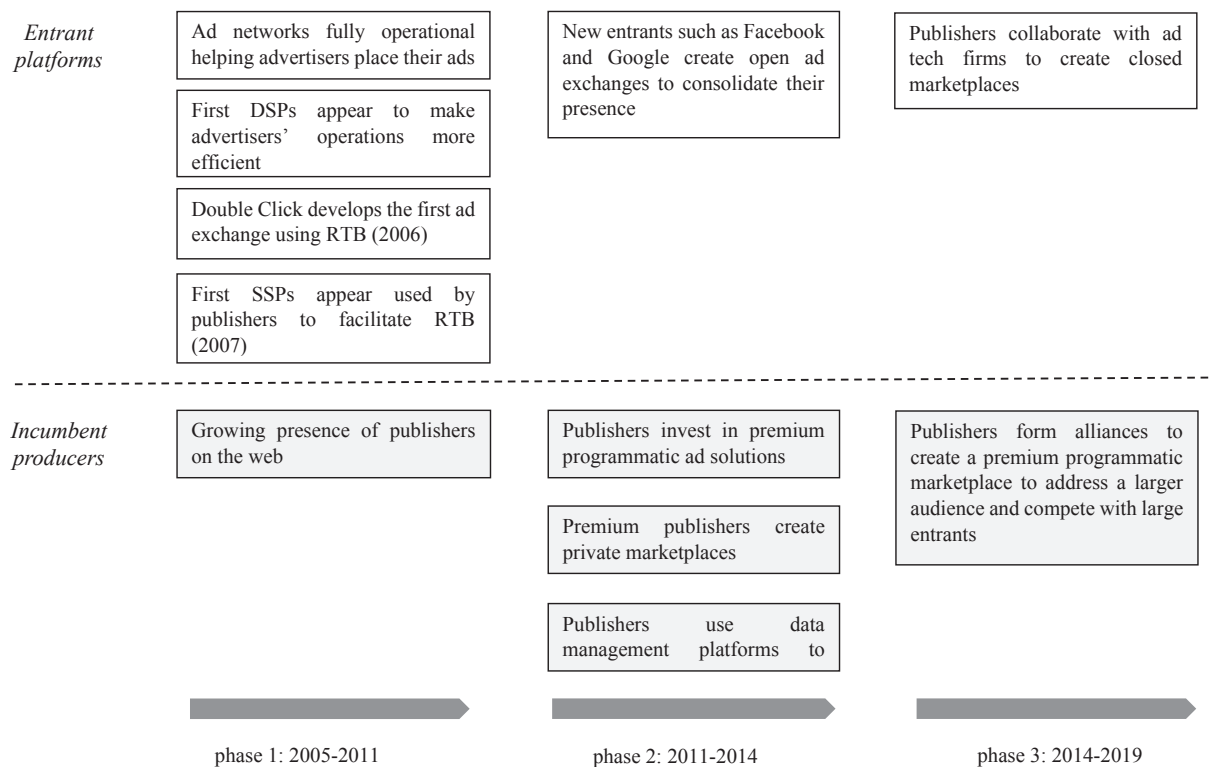


Fig. 2. The digital advertising ecosystem after its digital transformation.

provided the basis of our three-step process model. We searched for dimensions underlying those themes in an attempt to understand how different themes fitted together into a coherent picture. To establish the reliability of our findings (Andriopoulos & Lewis, 2009), we also drew on the literature, specifically studies about co-competition and ecosystems, to refine our labels and ensure the most robust findings. Fig. 3 presents the final data structure resulting from our coding procedure.

Temporal bracketing and process development. Once the coding procedure had been completed, we tried to investigate our final set of codes in order to identify the relationships between them and an underlying temporal and logical sequence. First, we placed the second-order categories on the timeline and tried to understand to which phase they belonged. We used our primary and secondary data to triangulate our intuitions. Second, we looked at the relationship between the codes and tried to identify the underlying relations between them. We divided the connections between second-order categories into “consequences” and “feedback loops.” Ultimately, we used that complex set of considerations to derive a process model which closely follows the logical sequence of events in the observed phenomenon. We present our findings in the following section. The narrative of the events follows the relationships between the second-order categories depicted in the process model, while the three aggregate dimensions identify the three main phases of the process. In line with Berends and Deken (2019), we present our findings through an “inductive composition,” where the narrative of the events adopts the constitutive elements derived from the coding, with a final three-phase model presented at the end of the narrative as emerging from the grounded evidence.

4. Findings

This section details the initial cooperative relationships between incumbent producers and entrant platforms at the low end of the market (phase 1), incumbents' subsequent competitive reaction to the proprietary commercialization of their high-end products (phase 2), and finally incumbents' adoption of entrants' technological solutions once

the ecosystem had been consolidated (phase 3). Table 2 shows additional supporting data for readers interested in integrating the evidence provided in the paragraphs below.

4.1. Phase 1: Selective cooperation

This first phase portrays an environment in which digital entrants create new distribution platforms and incumbent producers initially cooperate with them for the commercialization of their low-end products (i.e., advertising with inferior market value). We find that incumbent producers experienced challenges from the entrant platforms' lack of transparency and aggressive pricing, leading the former to limit their cooperation to where the entrant platforms' services were most needed (i.e., low-end products). Therefore, the first strategy we observe is selective cooperation between incumbent producers and entrant platforms.

This first phase broadly corresponds to the beginning of the media industry digitalization. When traditional media (i.e., incumbent producers) transferred their original products online in the early 2000s, they found themselves competing against each other in the same traditional environment (e.g., newspapers, magazines, and TV stations) while engaging online with digitally-born producers (e.g., portals and blogs), which also ran advertising-based business models. As a result of the increasing competition in advertising, all the incumbent producers ended up with large volumes of unsold advertising space. On the supply side of the ecosystem, the main challenge was that incumbent producers needed to monetize their vast (and mostly unsold) online advertising space, which was termed “remnant inventory.”² On the demand side, the main challenge was for advertisers to find effective ways to purchase different advertising spaces from a large number of incumbent

² Remnant inventory can be defined as an ad space on the publisher's website that the publisher has been unable to sell and is being sold at a lower cost (Kantar, 2014).

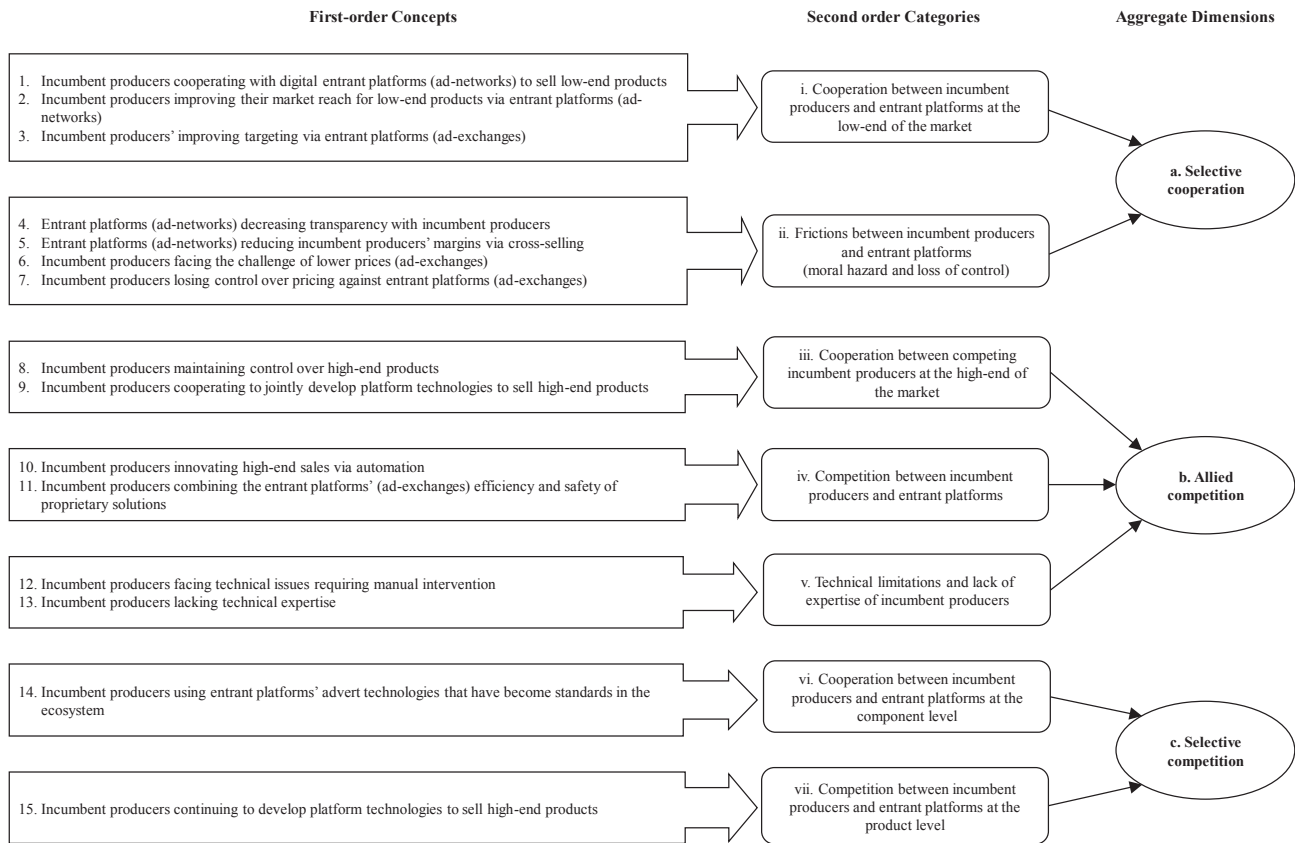


Fig. 3. Final data structure.

producers' web pages.

By 2005, technologically-advanced entrants on the advertising market had started to provide solutions to those challenges by creating the first advertising platforms called “ad networks” (Digiday, 2014). An ad network is a company that acts as an aggregating marketplace that buys the unsold remnant inventory from multiple websites, aggregates it depending on the target audiences, and sells it to individual advertisers or advertising agencies (e.g., WPP or Omnicom Group). Early examples of ad networks were 24/7 Media, AdWords (developed by Google), DoubleClick (acquired by Google in 2008), and Bing Ads (developed by Microsoft). Both major and smaller incumbent producers initially cooperated with such entrant platforms to sell their non-premium remnant inventory (their low-end products). Instead, the premium (high-end) advertising spaces were still sold only through producers' proprietary sales forces at higher prices. The synergies in the initial cooperation between incumbent producers and entrant platforms (ad networks) were confirmed by Jeff Webber, the publisher of *USA Today*:

If we sold every scrap of inventory, we wouldn't use ad networks, but right now it makes some sense for us. (The New York Times, 2008)

Such platforms thus helped advertisers to extend their reach by combining the inventory from hundreds of individual media producers and categorizing them so that ads could better target specific audiences (Kammer & Matheson, 2015). The successful rise of ad networks and the value of this innovation in terms of advertiser efficiency and reach was acknowledged by various industry analysts and experts.³ On that point, Forbes CEO Jim Spanfeller further noted:

³ According to the “2007 Ad Network Study” conducted by Collective Media, 77% of agencies in the USA used ad networks to purchase online media in 2006. Moreover, 52% of respondents in their survey highlighted reach, 66% efficiency, and 77% targeting, as the main reasons for using ad networks for digital media buying (Anfuso, 2007).

With a single insertion order and a single bill [via an ad network], we [publishers] allow advertisers access to more than 500 blogs that we have determined are reasonably well lit and good places for advertising to exist. (Griffin, 2008)

Despite the growth they supported with their technologies and despite being initially welcomed by incumbent producers, entrant platforms (i.e., ad networks) soon came into conflict with large incumbent producers. A first challenge emerged from ad networks often black-boxing incumbent producers with which they had contractual arrangements (Benes, 2017a). They lacked transparency and displayed misleading descriptions, such as “approved publishers” or “preferred publishers,” without ever revealing the actual list of publishers to the buyers where their ads appeared (Pere, 2012). In some cases, advertisers' ads almost never appeared on most preferred incumbent producers, such as *The Economist*, as such producers did not have any agreements with third-party ad networks. Ad networks were able to maintain such practices for a long period of time, by repackaging and reselling the inventory they claimed belonged to premium incumbent producers, despite not having any agreements in place with such high-end actors.

Another issue was the low inventory price at which entrant platforms were reselling incumbent producers' advertising spaces (Kammer & Matheson, 2015). Further, as more entrant platforms appeared over time, they started cross-selling inventories among themselves, thereby reducing incumbent producers' profits (Kammer & Matheson, 2015). A media technology company executive we interviewed summarized the challenges as follows:

It's a big mess, [ad networks] have bought the unsold spaces, saying “anyway you [publishers] don't need them,” and they repackaged them for premium advertisers, and kept the extra margins for themselves instead of sharing them with publishers.

The identified challenges refer to a moral hazard problem (Grossman & Hart, 1992) created by entrant platforms at the expense of incumbent

Table 2
Data supporting the emerged themes.

Second-order themes	Representative quotes
<i>Cooperation between incumbent producers and entrant platforms at the low-end of the market</i>	<ul style="list-style-type: none"> • “I believe reach and efficiency are definitely two of the selling points for (ad) networks in general” (Tom Hespos, CEO of Underscore Marketing, quoted in Anfuso, 2007) • “By bringing publishers and advertisers together in an open marketplace in which prices are set in a real-time auction, the Ad Exchange enables display ads and ad space to be allocated much more efficiently. This improves returns for advertisers and enables publishers to get the most value out of their online content” (Neal Mohan, VP of product management, quoted in Clifford-Marsh, 2009) • “Ten years ago you would never have had the information technology cheap enough to do these transactions” (Mike Driscoll, Head of Metamarkets, quoted in The Economist, 2014b)
<i>Frictions between incumbent producers and entrant platforms (moral hazard and loss of control)</i>	<ul style="list-style-type: none"> • “Real-time bidding has “hammered” many upmarket publishers by reducing their prices” (Henry Blodget, CEO of Business Insider and Editor-in-Chief, quoted in The Economist, 2014a) • “This has been an industry issue for some time, dating back before the advent of SSPs” (Jeffrey Hirsch, CMO of PubMatic, quoted in Benes, 2017a) • “What matters the most is that they [ad-networks] get their [ad] impressions. As long as the traffic is real and the ads are being served to real people, it’s never a problem” (Marc Goldberg, CEO of Trust Metrics, quoted in Silverman, Singer-Vine, & Vo, 2017) • “GroupM is pushing towards RTB, Google is doing the same, everybody says ‘Oh my God I have to do the same too!’ but they [producers] don’t really know what it is about, they get fooled” (Interviewed anonymous industry executive)
<i>Cooperation between competing incumbent producers at the high-end of the market</i>	<ul style="list-style-type: none"> • “There’s definitely a push to create more premium tiers of inventory. Publishers want to create those prestige brands [PMPs] because it’s a path to secure audience and more money” (Paul Bannister, Executive VP of Café Media, quoted in Digiday, 2017) • “PMPs arose during a time where it was the early days of programmatic, when ad quality and fraud were less effectively regulated in the open auction” (Ashley Wheeler, VP seller and accounts of Rubicon Project, quoted in Beeler, 2018)
<i>Competition between incumbent producers and entrant platforms</i>	<ul style="list-style-type: none"> • “Publishers including The New York Times, The Wall Street Journal and Time have set up private ad exchanges as a way to dip their toes into automation. More recently publishers have begun to automate their direct dealings with advertisers. Under these “programmatic direct” deals, a publisher’s sales rep may negotiate an arrangement with an advertiser that includes top-tier inventory like home-page-takeover ads at a fixed price for a guaranteed number of impressions” (APEX’s CEO, quoted in Chambers, 2015) • “[Through PMPs] Advertisers can reach audiences programmatically in real-time ... [giving them] the scale and efficiencies of an open exchange with the

Table 2 (continued)

Second-order themes	Representative quotes
<i>Technical limitations and lack of expertise of incumbent producers</i>	<p>safety of a private exchange” (APEX’s CEO, quoted in Chambers, 2015)</p> <ul style="list-style-type: none"> • “When it works, it’s beautiful. We’re not exchanging insertion orders or amending them seven times a month. It’s far superior to how traditional deals are done online. But we’re not bulletproof yet as an industry.” (Pete Spande, Chief Revenue Officer of Business Insider, quoted in Bilton, 2014) • “We should be able to trade every single piece of inventory dynamically and we can’t. That’s one thing we need to invest in.” (Hamish Nicklin, Chief Revenue Officer of Guardian, quoted in Gibson, 2019)
<i>Cooperation between incumbent producers and entrant platforms at the component level</i>	<ul style="list-style-type: none"> • “Today we are plugged in Google’s advertising tools because part of the flow passes through them.” (Interviewed executive from the advertising subsidiary of the newspaper La Repubblica) • “That’s why we broke away from the traditional constraints of ad servers and SSPs to build new programmatic solutions directly into the product we now call Ad Manager ... [with features] that help you maximize yield across reservations, private marketplaces, and the open auction” (Jonathan Bellack, Director of product management for publisher ad platforms of Google, quoted in Marvin, 2016)
<i>Competition between incumbent producers and entrant platforms at the product level</i>	<ul style="list-style-type: none"> • “We are working together to build a better digital ecosystem for advertisers, readers and publishers. The Ozone Project is a response to the challenges we all face and aims to facilitate the highest standard of digital advertising and ensure quality journalism and content continues to be funded.” (Hamish Nicklin, Chief Revenue Officer of GNM, quoted in The Guardian, 2018) • “The best thing for us to do to compete [against the major tech platforms] was to get together and make an alliance, a collaborative project where you bring together all these old-school companies, all of them have TV stations, newspapers or radio, and build a platform where we could address advertising, and probably in the future, a paid-content wall.” (Nonio’s steering committee member, quoted in Veseling, 2019)

producers—an issue that was clearly identifiable at least in the initial stage of the ecosystem’s digital transformation. As a result, incumbent producers did not embrace entrant platforms (ad networks) in a stable manner due to frictions related to transparency and price. The manager of a large Italian media company that we interviewed explained the shortcomings of entrant platforms:

If you try to call Google, you will not get anyone responding. They send you a standardized monthly report with your revenues, but you cannot ask specific questions!

Interestingly, we found that platforms dynamically adapted to incumbents’ concerns by improving their offers. To solve the transparency problem, entrant platforms developed and introduced a more advanced technological solution—“ad exchanges.” While the transaction through the ad network occurred via agents and manual workflow, the new ad exchanges offered digital, machine-automated media buying, giving birth to what the industry defined as “programmatic media buying” (Adweek, 2013). The progression toward a digital and more technologically-advanced solution was explained by an executive

working at an ad-tech network:

Today we are in a context where not only publishers have a strong identity crisis but also those who were working as simple aggregators on a manual basis of publishers' inventory, let's say the ad networks, haven't been able to evolve into a technological platform, and today they are in crisis, so much that almost all pure ad networks have disappeared and transformed in something new.

Ad exchanges allowed publishers and advertisers to buy and sell advertising space such as impressions through real-time auctions ([The Guardian, 2015](#)). Sellers made their audiences available on the platform, while buyers selected a specific audience and bid for it ([Interactive Advertising Bureau, 2012](#)). By doing so, the winner could basically expose the audience to the right ad, at the right time. Advertisers used additional demand-side platforms to connect to an ad exchange, while publishers made their inventory available through supply-side platforms which allowed them to connect to multiple ad exchanges. Hence, the rise of the ad exchange entrant platform—a system that still works today—was an important milestone in the emergence of a more complex ecosystem for digital advertising. Examples of successful ad exchanges are Right Media by Yahoo, DoubleClick by Google, and OpenX. The real-time automation and efficiency of the new entrant platforms (ad exchanges) attracted incumbent producers' cooperation, as confirmed by Rajeev Goel, founder of PubMatic:

Using data, programmatic advertising can be much more targeted and relevant. If you're a publisher, we can, within 100 ms, sell space on your website to thousands of different advertisers. ([The Business Times, 2014](#))

The efficiency mechanism was also confirmed by [The Economist \(2014a\)](#), which mentioned that ad exchanges made it easier and less costly for advertisers to discover specific audiences, thereby reducing the effectiveness of the once vital aggregation role of ad networks.

However, tensions emerged regarding the lower revenues per impression and the incumbent producers losing control over pricing ([The Economist, 2014b](#)). The growth in programmatic buying in fact led to a decrease in advertising prices, since advertising spaces were sold more cheaply on ad exchanges, causing a reduction in margins for incumbent producers, as noted by Brendan Hughes, the Chief Digital Officer at Independent News and Media (INM):

In some cases, for every euro spent by company advertising on its online platforms only 0.40 (Euro cents) goes to INM. The rest falls into a black hole. ([The Times, 2017](#))

Interestingly, even in the case of ad exchanges, upmarket incumbent producers gradually diverted from cooperating with those digital entrant platforms because they felt threatened by a price reduction in their premium ads.

At the same time, automation also led to an abundance of what was considered "toxic" or "random" inventory, either because it came from obscure providers, or because it constituted odd advertising which was systematically relegated to peripheral areas (e.g., the very bottom of web pages) of premium incumbent producers' websites, thus commoditizing media buying ([Gold, 2007](#); [Shields, 2011](#)). [Karpinski \(2010\)](#) also mentions that challenge and points out that entrant platforms (ad exchanges) provided the opportunity to monetize the unsold inventory, but lowered the cost per impression and decreased brand value—a major threat for elite incumbent producers. Speaking about the commoditization of digital media and the increasing competitive pressure exerted by ad exchanges, David Pemsel, CEO of *The Guardian*, stated:

There are some pretty terrible practices within the programmatic advertising space, and it is unclear how much money is lost in the flow between the client paying for an ad and the news outlet that has created the audience ([Financial Times, 2019](#)).

In sum, in phase 1, we noticed that incumbent producers initially cooperate with new distributive platforms to commercialize their low-end products (especially if unsold otherwise), but such cooperation can expose an incumbent producer to frictions related to moral hazard (e.g., lack of transparency) and loss of control (e.g., lower pricing).

4.2. Phase 2: Allied competition

The second phase depicts an environment in which incumbent producers start competing with entrant platforms after realizing, in phase 1, the possible downsides of cooperating with them. Our data show that incumbent producers in phase 2 compete with entrant platforms to defend their more valuable high-end products and ally among themselves to develop proprietary platforms. The dynamic in phase 2 is one of allied competition. It takes place because all incumbent producers can envision, by phase 2, that the challenges experienced in phase 1 with their low-end products could affect over time their high-end premium market.

Around 2011, the lack of transparency and price commoditization challenges faced with entrant platforms induced incumbent producers to start competing with entrant platforms by creating their own private marketplaces for high-end advertising products. Large incumbent producers such as The New York Times Company, Condé Nast, Tribune Media, and Gannett, and technology providers such as MediaMath engaged in the formation of private marketplaces through which to sell their ads ([Digiday, 2017](#)). At the very beginning, those were manually-operated, but were soon upgraded into programmatic technologies. Such private marketplaces were closed ad exchanges, resembling an exclusive "by-invitation-only" circle created by single incumbent producers, through alliances with technology partners, to sell their premium inventory at higher prices while providing superior quality assurance ([Chen, 2017](#)).⁴ When asked about the drivers behind the formation of private marketplaces, a media technology industry executive we interviewed observed that:

Now we are seeing the birth of restricted SSPs (supply-side platforms), the private exchange, which is the premium's answer to the aggregation of the long tail (...) Premium publishers don't want to enter the open market because they don't want to lose control over prices, volumes and advertisers (...) In reality, publishers said: I don't want to give my inventory to Google, let's respond with a local consortium.

Promotion by those private marketplaces embedded an appealing value proposition that provided an ideal match between advertisers' requests for premium inventory bidding with incumbent producers' need to target their high-end advertising inventory at premium advertising buyers ([LaRue, 2017b](#)). That shift was described as a "turning point" by Lori Tavoularis, the managing director of revenue partnerships for Tribune, a leading American publishing company, who explained the benefit of private marketplaces:

Prior to the construct of a private marketplace, it was very difficult for the buy side to identify that premium inventory they were looking for. Going to a private marketplace definitely increased the amount of conversations and business we were doing with agency trading desks and with agencies. ([Moses, 2014](#))

Incumbent producers fought back against entrant platforms to offer their inventory to a selected group of buyers and charge more for ads that appeared next to their best content ([Digiday, 2017](#)). The reason for incumbent producers forming and investing in those private marketplaces was also highlighted by Mark Coad, CEO of PHD Media, who, when commenting on the reasons behind their growth, noted:

I think in a way they have to form their own exchanges. They'll either do it within their own environments or someone will do it for them, and I don't see any other marketplace any differently. If you look at the stock exchange, I don't go to a stock exchange to buy certain mining shares

⁴ Private marketplaces required a membership card known as deal ID, a unique number for automated ad buying that matched buyers and sellers based on a pre-negotiated criterion ([Morrissey, 2014](#)). The negotiated terms could be the minimum bid price, section of the site, placement on the page, etc. As soon as those terms were agreed between the buyer and seller, the publisher created a deal ID through SSP and passed it manually to the buyer they had inserted into demand-side platforms ([LaRue, 2017a](#)).

and go to another one to buy my retail stocks and another one to buy my manufacturing stocks. There is a massive consolidation where someone owns the entire interface. It might be three to five years, but someone is going to own the exchange. (Australian Financial Review, 2015)

The competition of incumbent producers with entrant platforms was a form of protection of their business models and revenue sources. The more intense the competition with entrant platforms, the closer was the cooperation to develop the private marketplaces between incumbent producers (see feedback-loop in phase 2, Fig. 4). Through tighter control on premium (high-end) inventory, producers would be able to obtain higher revenues per impression and secure audiences (Digiday, 2017). Incumbent producers, however, faced some challenges with the formation of private marketplaces, such as technology compatibility, insufficient inventory, and data leakage. They also often experienced integration problems between their supply-side platforms and buyers' demand-side platforms which prevented the deals from happening (Bilton, 2014). Not surprisingly, incumbent producers described the lack of technology or uneven technological proficiency across parties as the private marketplaces' biggest challenge.

The private marketplace manual component, which required staff to fix issues and discrepancies, indicated that workflow was not fully efficient and automated, but rather a mix between programmatic and human (Digiday, 2014). An insufficient inventory problem was also associated with technological incompatibility. Several programmatic executives, such as Charlie Fiordalis of Media Storm, referred to the mismatching of incumbent producers' and advertisers' first-party data, or excessive data overlays on the demand- and sell-side, as causes of the reduced scale of available inventory:

Sometimes there is not enough inventory for us to bid, especially when we run campaigns in a very short period of time. In that case, we need to be good friends with the publisher and say "Can you please prioritize our deal ID and clear our X impressions in the following three days?" It does take some manual work. (as quoted in Chen, 2017)

To avoid the aforementioned challenges and compete effectively with entrant platforms, incumbent producers developed technological solutions that preserved their high-end inventory through technological innovation (in our setting, automation). Such marketplaces were known as "premium programmatic" marketplaces, also referred to as "programmatic direct" (Adweek, 2013). The mechanism that led incumbent producers to create premium programmatic marketplaces was the

optimization of the audience buying process that traditional private marketplaces lacked.

One of the drivers leading incumbent producers in several countries worldwide to coalesce and create premium programmatic marketplaces was the incentive to compete with the open ad exchanges created by disruptive entrants such as Google and Facebook. The Australian Premium Advertising Exchange (APEX), an ad exchange platform created in 2015 by publishers Mi9 and Fairfax Media, with AppNexus as a technological partner, exemplified incumbent producers' willingness to match and scale the capabilities of disruptive entrants. Similar initiatives involved Kiwi Premium Advertising Exchange (KPEX) in New Zealand and the Pangaea Alliance in the UK, whose members included the *Financial Times*, *The Guardian*, and Reuters. The APEX CEO described premium programmatic marketplaces as platforms "where advertisers can reach audiences programmatically in real time" giving them "the scale and efficiencies of an open exchange with the safety of a private exchange" (Chambers, 2015). One KPEX platform executive explained the benefits for incumbent producers of creating a premium private exchange:

Publishers worldwide are wrestling with similar issues particularly in the face of very dominant organizations like Google and Facebook, so what we've seen in different markets worldwide is a coming together of traditional competitors. It [KPEX] offers the efficiency of real-time bidding but with the security of knowing that your brand is going to pop up in very trusted premium sites with brand-safe premium content. (The New Zealand Herald, 2015)

However, the technical limitations and lack of expertise of incumbent producers were evident in this second phase. Jarrod Dicker, the Vice President of commercial technology and development at *The Washington Post*, noted:

We know that not every publisher might have that expertise, or may not necessarily be staffed to understand what they should be doing in this space. We're trying to alleviate all of that, and we're able to tie it into a lot of tools that make for a seamless process. (Wodinsky, 2019)

In sum, we highlighted that in phase 2 incumbent producers jointly compete with platforms to commercialize their high-end products and develop proprietary platforms, after noting the challenges of selective cooperation in phase 1 for their low-end products. We refer to the dynamic in phase 2 as allied competition. However, incumbent producers also encounter technical limitations and a lack of expertise, thereby

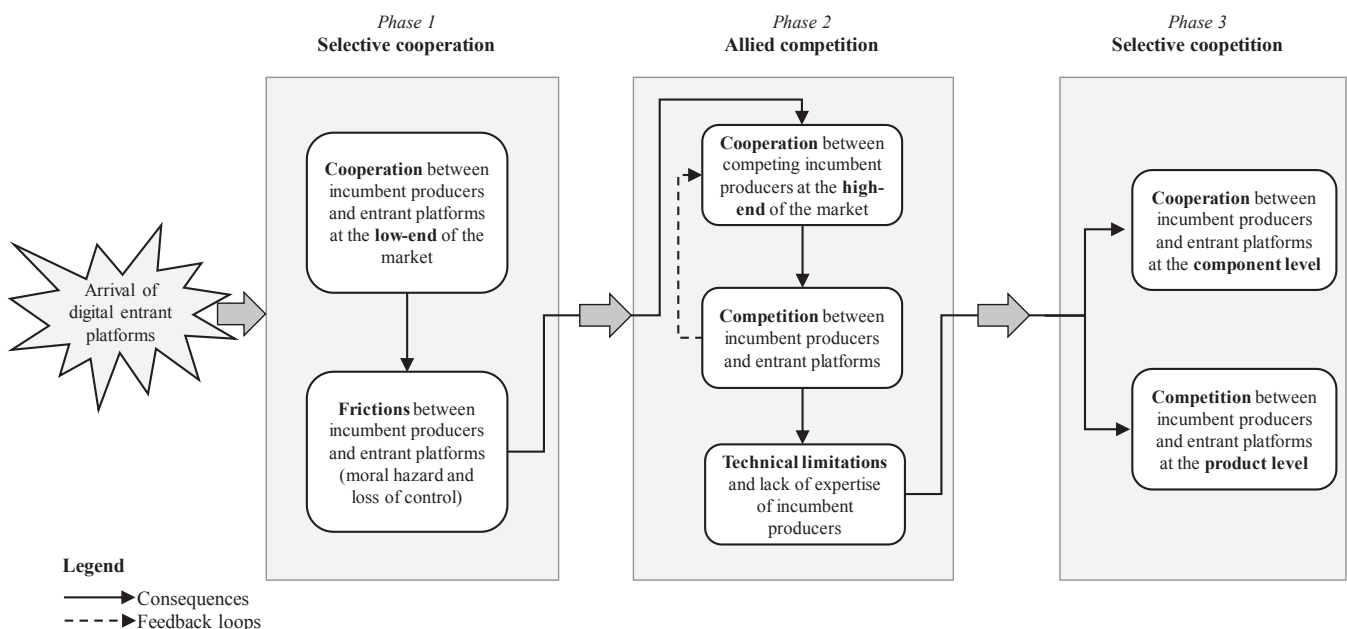


Fig. 4. Process of incumbent producers' responses to digital platforms entrants.

leading to the dynamics illustrated in phase 3.

4.3. Phase 3: Selective cooperation

In the third phase, as a new ecosystem is consolidated, incumbent producers start to cooperate at the component level with entrant platforms which are becoming de-facto standards, as the incumbents need to use the new technological bottlenecks. At the same time, incumbent producers continue to compete with entrant platforms at the product level by continuing to develop producers' proprietary platforms. We define the simultaneous presence of both competition and cooperation that characterizes phase 3 as selective cooperation. Our analysis reveals that incumbent producers compete at the product level (e.g., advertising spaces) with entrant platforms while they cooperate with them at the component level (e.g., technological tools) by utilizing their complementary technologies in the ecosystem.

By around 2017, some of the entrant platforms' superior technologies in online advertising became standard solutions in the ecosystem. Ad tools such as ad servers' programmatic platforms and bad-ad detectors developed by entrant platforms such as Google, OpenX, and Ad Lightning became central across all players engaged in digital advertising. As a consequence, incumbent producers started to form partnerships with those component vendors. As explained by a comScore top 100 publisher, incumbent producers had little incentive to invest in the creation of their own ad server:

Could we make our own server? The rep asked. "Hell yeah", we could. But it is a volatile business that I don't want to be a part of. I'll leave ad serving to Google. (Benes, 2017b)

The role of entrant platforms (component vendors) as relevant partners in the ecosystem is further strengthened by their ability to improve quality control over incumbent producers operating on a specific exchange, as noted by John Murphy, VP of OpenX's Marketplace Quality:

We're very strict with the kinds of publishers which operate on the exchange. We reject 30 to 40 per cent of the domains which apply. And once you're through the door, any traffic from a publisher goes through our real-time traffic quality platform, which determines whether that traffic is real or misinterpreted (City A.M., 2016)

Industry analysts also highlighted the increased use of ad technological components by upmarket publishers and agencies. A study by Industry Index of 75,000 US publishers revealed that 63% of those publishers were using between 51 and 150 technologies on their websites, including exchanges, yield optimization tools, and supply-side platforms, whereas only 2% had fewer than six technologies installed (Shaevitz, 2018).

Incumbent producers were found to use Google Ad Manager, an ad server that helped incumbent producers in yield management, with tasks aimed at optimizing the matching between ad buyers and sellers to maximize sales. Ad servers also allowed incumbent producers to sell inventory via private programmatic marketplace or through guaranteed deals which detected ad fraud (Behera, 2019). Another example of selective cooperation is the use of Nativio's ad server by more than 500 major UK and US incumbent producers, such as The Philadelphia Inquirer and Tribune Publishing. Nativio's technology presented producers with numerous benefits, such as support across various advertising formats, yield optimization through direct campaigns and open auctions, and data analytics.

The increased collaboration between large Italian incumbent producers and Google since 2017 is another example. The role of entrant platforms as de-facto standards was further confirmed during our interview with a former executive of *La Repubblica's* holding company, GEDI Gruppo Editoriale, who noted:

We have already entered in phase three of the evolution. After a period when publishers tried to develop their own private exchanges, now they use most of the technologies developed by these giants. (Anonymous executive at *La Repubblica*).

Interestingly, incumbent producers maintained their competitive strategy against platforms at the product level by continuing to invest in their private programmatic marketplaces in phase 3. By developing their private ad exchanges, incumbent producers offered a premium inventory of high-end advertising space to advertisers, thus maintaining control and simplifying purchasing processes for their clients while guaranteeing a fraud-free and transparent marketplace. In 2018, three of the UK's most prominent producers, *The Guardian News and Media*, *The Telegraph*, and *News UK*, launched the Ozone Project, a programmatic premium platform to serve advertisers privately in a transparent and brand-safe manner (The Guardian, 2018). In Germany, the four biggest publishing houses formed an advertising alliance to create a joint technical infrastructure to compete with entrants' disruptive platforms (Davies, 2019). A similar incumbent producer alliance, Project Nonio, was created by the six largest Portuguese media companies in 2017 as an alternative ad platform to fight the dominance of entrant platforms such as Google and Facebook (Southern, 2019). When talking about the benefits of the Pangaea Alliance, which was launched in 2015 as a single programmatic solution offering advertisers the ability to access inventory across a group of renowned incumbent producers, Tim Gentry, global revenue director at *The Guardian News and Media*, noted:

On our own at the Guardian we have 43 million monthly unique users. The alliance had a combined audience of 110 million, making it more comparable to high-traffic social media sites. It means we're starting to knock on the doors of sites and brands like Twitter, which has 183 million users by the same measure (quoted in the *Financial Times*, 2015).

In sum, we posit that incumbent producers in phase 3 cooperate at the component level with platforms by using some of their superior technologies in the ecosystem. At the same time, they compete at the product level with entrant platforms to commercialize their high-end products directly. We have labeled this strategy of simultaneous cooperation and competition at different levels as selective cooperation.

5. Discussion and conclusion

This study aimed at providing an answer to an important question: *How do incumbent producers adapt to the rise of new platform-based ecosystems, and how does the adaptation process evolve as an ecosystem matures by becoming increasingly digitalized?* To respond to this question, we investigated the global digital advertising ecosystem (2005–2019) in which incumbent producers were confronted with digital entrant platforms that progressively dominated the ecosystem. Given the novelty of the phenomenon and the relative scarcity of studies, we conducted an inductive longitudinal study to achieve a better theoretical understanding. Our findings indicate that the adaptation process by incumbents is characterized by specific incumbent-challenger dynamics that evolve through three phases: (1) selective cooperation; (2) allied competition; (3) selective cooperation. Moreover, those phases progressively involve products and technological components. By building on our coding and empirical narrative, Fig. 4 provides a graphical representation of the incumbents' adaptation process to platform entrants in new digital ecosystems. In the following paragraph, we offer important theoretical reflections and implications related to the three phases. Following Zimmermann, Raisch, & Birkinshaw (2015), we present these theoretical implications through formal observations, which help to crystalize the contribution and generalizability of our findings.

In the early stage of the emergence of a platform-based ecosystem (phase 1), incumbent producers cooperate with entrant platforms (ad networks and ad exchanges in our setting) to commercialize incumbents' low-end products. The mechanism inducing cooperation is the incumbents' desire to commercialize their less valuable and often remnant inventories through entrant platforms to achieve a broader distribution. At the same time, entrant platforms can take advantage of their central position in the ecosystem by not being transparent and fair regarding the pricing and sale of incumbent producers' products. The

moral hazard (Grossman & Hart, 1992) represented by entrant platforms induces incumbent producers to opt for selective cooperation, whereby they limit their cooperation to their low-end products. We summarize this finding in our first observation.

OBSERVATION 1. *In the early stages of a platform-based ecosystem, incumbent producers cooperate with entrant platforms to commercialize their low-end products. As entrant platforms can take advantage of their central position in the ecosystem to behave opportunistically, incumbent producers limit their cooperation with entrants to a selective cooperation on low-end products only.*

In phase 2, incumbent producers are likely to change their response from cooperation to competition as an effect of the selective cooperation strategy described in phase 1. We observed that incumbent producers ally themselves to compete with entrant platforms in what we define as allied competition. The reason is that incumbent producers have already experienced the possible downside of cooperating with entrant platforms during phase 1, and they now envision similar challenges for their most valuable high-end products. Therefore, incumbent producers collaborate among themselves to develop proprietary platforms (Cozzolino & Rothaermel, 2018) so as to retain their premium high-end products for direct commercialization—instead of relying on entrant platforms' commercial solutions. That approach effectively puts those incumbent producers in competition with the leading entrant platforms in an ecosystem that would otherwise commercialize even the incumbent producers' high-end products. Therefore, a differentiation strategy adopted by incumbent producers for their premium products (Porter, 1980) may induce them, in the setting of emerging ecosystems, to try to match the offering of leading entrant platforms within it. We named the strategy in phase 2 allied competition. Thus, we can expect that:

OBSERVATION 2. *To avoid the moral hazard and opportunism experienced in their low-end market during collaboration with entrant platforms, incumbent producers collaborate between themselves to commercialize their high-end products. Such new cooperation helps incumbents to develop proprietary platforms for their high-end products, rather than using entrant platforms' solutions.*

In phase 3, incumbent producers need to adopt the entrant platforms' technological components that have become industry standards and/or bottlenecks in the (now mature) ecosystem (Hannah & Eisenhardt, 2018). Therefore, incumbent producers are forced to cooperate at the component level with entrant platforms by using their technologies. At the same time, incumbent producers in phase 3 continue to compete at the product level with entrant platforms by developing their own platforms to commercialize their high-end products directly. Thus, we expect the following:

OBSERVATION 3. *When a platform-based ecosystem matures, incumbent producers are more likely to accept cooperation with new entrant platforms that control a technological component of the ecosystem, but they still compete with entrant platforms at the product level for proprietary commercialization of their high-end products.*

5.1. Theoretical implications

The major contribution of the study relates to advancing a novel process model depicting the changes in cooperative and competitive strategies over time between incumbent producers and entrant platforms during the formation of a digital, platform-based ecosystem. The process model contributes to multiple literatures, including incumbent adaptation, platform-based ecosystems, competition and cooperation, and business models.

5.1.1. Incumbent adaptation to platform-based ecosystems

Our findings expand the incumbent adaptation literature, which has traditionally focused on non-platform-based technological changes (e.g., cement, airlines, computers, photography, drugs) (Christensen, 1997; Henderson & Clark, 1990; Sosa, 2011; Tushman & Anderson, 1986). Although that literature has been fruitful in explaining incumbents'

failures (e.g., Tripsas & Gavetti, 2000), reaction strategies (e.g., O'Reilly & Tushman, 2008), and incumbent-entrant dynamics (e.g., Christensen & Bower, 1996), some of its findings need to be integrated when considering disruptions from platform-based ecosystems. For instance, Christensen's model of disruptive innovation indicates that incumbents ignore entrant competition in the lower-end market. We integrate that finding by showing that incumbents do not always ignore entrants at the low-end but rather can collaborate with them for commercialization purposes when entrants are platforms in a new ecosystem. Our model suggests that incumbent producers compete with entrant platforms only in a later phase when they envision a potential attack on their high-end market. Moreover, the reaction strategy is different from the type of cooperation seen in most incumbent adaptation studies. In contrast to some common evidence of vertical cooperation between incumbents and entrants (e.g., Pisano, 1990), we found that incumbent adaptation to digital platforms may require cooperation between incumbents against entrants (allied competition).

Our empirical evidence corroborates a recent theoretical tenet advanced by Cozzolino and Rothaermel (2018), according to whom incumbents cooperate among themselves when they all face complementary-asset discontinuities. Our contribution complements those authors' work by showing that incumbent producers cooperate to avoid the propagation of entrant platform challenges from "low-end" to "high-end" products. Therefore, our addition is the key dimension of low-end versus high-end products in explaining such dynamics. We posit, in fact, that segmenting the market may provide insights into competitive dynamics that were not previously considered.

Finally, our process model provides a multi-level appreciation of competitive dynamics in platform ecosystems: (1) high-end versus low-end products, but also (2) products versus technological components (as seen in phase 3). That is a novel and compelling contribution as, to date, the literature on incumbent adaptation has rarely described multi-level dynamic responses. A recent exception is Ozcan and Hannah (2020), who examined the online advertising industry, but from the perspective of advertising agencies dealing with digital suppliers. While they found that advertising agencies needed to reconfigure their supplier ecosystems to incorporate new disruptive technologies, our contribution provides an appreciation of cooperation and competition processes at different levels, through which incumbents can fit into a new platform-based ecosystem.

5.1.2. Platform ecosystems, competition, and cooperation

This paper also contributes to the platform ecosystems literature (e.g., Gawer & Cusumano, 2014; Snihur, Thomas, & Burgelman, 2018; Tiwana et al., 2010) and related competition and cooperation studies (e.g., Bacon, Williams, & Davies, 2019; Gnyawali & Park, 2011; Padula & Dagnino, 2007). A central argument of the platform ecosystems literature is that technological evolution in interdependency situations stimulates competition and cooperation (Gawer, 2014; Hannah & Eisenhardt, 2018), and that platform owners need to balance their business and technological decisions not to discourage complementors (Parker & Van Alstyne, 2018; Zhu & Liu, 2018). We also found that in the specific case of incumbent producers adapting to a new ecosystem it is necessary to control some technological components on which to compete while allowing complementors to develop components that enhance ecosystem functionality. For instance, our model reveals that incumbent producers can jointly control some proprietary platforms (through allied cooperation) but then use the new bottleneck components of the ecosystem (through selective competition). Our study characterizes those dynamics, which are important for the platform literature (e.g., Ansari et al., 2016; Parker & Van Alstyne, 2018), by adopting the unique perspective of incumbent producers. Our data reveal that a multi-level and temporal approach of three different competition and cooperation strategies can be necessary for an incumbent producer to balance the positive and negative interdependencies with an ecosystem's key actors. This finding extends previous studies in

the co-competition literature that focused on the intertemporal variance of firms' relational ties (e.g., from competition to cooperation to co-competition) while keeping the roles (e.g., producers, platform owners) stable (e.g., Gnyawali & Park, 2011; Hannah & Eisenhardt, 2018). In fact, we tracked variations of competitive roles (e.g., incumbent producers also becoming joint platform owners), relationships, and business models (i.e., brick-and-mortar versus digital).

The characterization of the three strategies is another main contribution of this study. The observed response by incumbent producers to entrant platforms' opportunistic behavior was named selective cooperation. We show that incumbents can limit the cooperation to only their less valuable low-end products when platforms abuse their orchestrating position in an ecosystem (Parida et al., 2019). That selective cooperation strategy contributes to the discourse on the instability of alliances (e.g., Das & Teng, 2000) and to a more fine-grained understanding of cooperation between firms.

The allied competition strategy adds theoretical nuance related to the commercialization of high-end products by incumbents in platform-based ecosystems. Further, the selective co-competition finding is an ecosystem strategy that prior research has not fully unpacked. While scholars have recently observed the need to turn to "co-competition" over time after the downsides of cooperation and competition alone become apparent (Ansari et al., 2016), our contribution characterizes the product and component levels at which co-competition takes place. These findings also integrate current evidence on the role of bottlenecks (Hannah & Eisenhardt, 2018) and components (Adner, 2012) in ecosystems.

5.1.3. Platforms and business models

This paper also contributes to the conversation on business model innovation (Corbo, 2017; Foss & Saebi, 2017) by providing a detailed process explaining the nuanced phases through which incumbents can adapt their business models to a new ecosystem (e.g., Cozzolino et al., 2018). In our empirical context, we examined media publishers that traditionally used a multi-sided markets business model, which is effectively equivalent to platforms, insofar as they engage with multiple customer groups and monetize their interactions (Nucciarelli et al., 2017). Business model literature has specifically called for a better understanding of business models and technological innovation as distinct yet related drivers of competitive advantage (Baden-Fuller & Haefliger, 2013). Empirically, to identify whether competition and performance are driven by technology or business model choices, one should keep one aspect constant and examine variance in the other. In our setting, as both incumbents (content producers) and new entrants (advertising platforms) rely on multi-sided business models, we were able to focus on the technological implications for competition.

Prior research has addressed cases where companies, particularly digital-born new entrants, cater to different customer segments in a business model portfolio (e.g., Ahuja & Novelli, 2016; Aversa, Haefliger, & Reza, 2017; Aversa & Guillotin, 2018). Through business model servitization (Visnjic, Wiengarten, & Neely, 2016), for instance, firms engage with several customer groups. In more recent work, Aversa et al. (2020) show how Amazon's business model portfolio disrupted traditional retailers by delivering a set of services through the same website. Our work complements that emerging stream of research by suggesting two noteworthy points. First, we extend recent studies on business model adaptation (e.g., Cozzolino et al., 2018) by showing that digital transformation allows incumbents to diversify their traditional, servitized business model for premium customers by adding an automated digital business model for lower-end customers. Second, we contribute to the emerging literature on digital transformation (Cennamo, Dagnino, Di Minin, & Lanzolla, 2020) by showing how increasing the engagement with digital technologies sets organizations on transformational paths, which might further develop the incumbents' business model, for example, by connecting them to an ecosystem of different actors, where their portfolio needs to be integrated with those of key

complementors—such as the entrant platforms—which are competitors within other segments.

5.2. Implications for practice

Our findings have noteworthy implications for incumbent producers' strategies in response to entrant platforms shaping new business ecosystems. Our three-phased process framework can help the managers of incumbent firms to form a better assessment of the appropriate timing of their choices with respect to the trade-off between cooperation and competition with challenging entrants. In doing so, incumbents can reap the benefits of cooperating with entrant platforms on their lower-end products (i.e., the long tail), as long as they are able to protect and preserve control over their high-end products. If their premium offering is threatened by entrant platforms, as is likely as entrants acquire more industry knowledge and consolidate their position over time, incumbents may coalesce and compete by developing their own platform solutions. That is the case with the Pangaea Alliance, whose members include core industry players such as *the Financial Times*, *The Guardian*, and Reuters. Incumbent producers may eventually opt for a hybrid strategy by competing with entrant platforms at the product level, while cooperating with them on the technological level by using some of their technological components which have become standard in the ecosystem.

Our findings are generalizable beyond the advertising industry. Indeed, similar patterns can be observed in industries as diverse as financial services and the automotive industry. For instance, Klarna, a new entrant platform in the financial services industry, introduced online payment solutions that allowed customers to pay later or divide the payments into monthly installments (Parmy, 2018). Despite high transaction charges to merchants of between 3% and 4%, financial services companies (e.g., Mastercard) and merchants worked with Klarna due to the limited risk of fraudulent transactions and the advantage of accessing multiple payment methods. As Klarna gained popularity, financial services companies started thinking about the loss of transaction fees through Klarna facilitating the payments and began offering similar payment solutions, such as improved checkout and fraud prevention, and created new mobile solutions, such as Apple Pay. However, since Klarna's smart payment solution was widely adopted by both merchants and customers, financial services companies decided to work with Klarna for enhanced payment options while continuing to develop their own payment solutions to get a larger share of digital banking.

Another example that resonates with this study's findings is the producer of electric vehicles Tesla, which created the Roadster model by partnering with Lotus, Siemens, and additional manufacturers to gain access to the chassis and components needed to produce the vehicle. Once the Roadster had gained significant attention due to its electric engine and mileage capability, giant car makers terminated their support by developing their own electric vehicles, such as Daimler's Smart and Chevrolet's Volt, to capture the electric vehicles market. However, those corporations realized that they lacked the capabilities to develop a battery pack capable of providing significant mileage (arguably one of the most critical technological bottlenecks) and partnered with Tesla to supply batteries while creating their own vehicles (Davis, 2010). In both the aforementioned examples, disruptors depended in the early stages on the incumbents, which in turn benefited from the disruptors' innovations. Over time, alliances were terminated, but then cooperation was restored over components that became standards or bottlenecks while competition was maintained at the product level.

Such cases suggest to executives that, despite engaging in different industries, our insights point to widespread patterns of competition among firms' business models. Hence, the evidence suggests that reflecting on how embracing technological innovation—and in particular digital transformation—can trigger not only opportunities for the firm but also competitive responses by other players. Our insights on

digital transformation in platform ecosystems further suggest two important reflections for practitioners. On the one hand, the advent of digital technologies equips new entrants with the opportunity to develop valuable capabilities quickly to compete with established competitors, and we warn incumbents from under-estimating how rapidly such new players can reach market-dominant positions. On the other hand, the multi-sided nature of platforms requires firms to cater to multiple customer groups at the same time—a challenging task that might require superior customer knowledge. That might provide incumbents with an opportunity to develop relational capabilities to co-create value in those market segments which are not yet suited for a purely digital engagement (in our case, the higher segments of the market), and deploy temporary strategies to cope with competing new entrants, while implementing the transition to a fully-digital engagement.

5.3. Limitations and future research

As with any study, our work has limitations that also offer opportunities for future research. First, we acknowledge that our setting presents specific patterns and boundary conditions, such as the advent of advanced digital entrants facing traditional, long-standing, and highly institutionalized incumbents, in a market where competition has become technology-driven. Careful consideration is required therefore when generalizing our findings to other industries, which might differ in their boundary conditions and underlying assumptions. Further, research may identify additional incumbent strategies in reaction to entrant platforms in settings that present characteristics that diverge from ours by exploring contexts embracing ecosystem logics, such as manufacturing and service industries, knowledge-intensive, and capital-intensive businesses following the digitalization process brought by the Internet, and through Industry 4.0 technologies (e.g., blockchain, Internet of Things—see [Aversa, Formentini, Iubatti, & Lorenzoni, 2020](#)). Future studies may also test the validity of our results in settings where changes in collaborative behavior may be caused by the non-technological shifts resulting from major exogenous shocks such as pandemics or terrorist attacks ([Arslan & Tarakci, 2020](#); [Corbo, Corrado, & Ferriani, 2016](#)).

Future studies may explore whether the dynamics depicted in our three-stage process can be found in contexts where there is a significant preference toward cooperation over competition, such as in the case of Internet of Things smart city alliances (e.g., [Bresciani, Ferraris, & Del Giudice, 2018](#)), where competition would be detrimental to both incumbents and entrants. Interesting results might also stem from the assessment of the type of cooperative forms adopted by incumbents, for instance, by distinguishing between formal collaboration models such as alliances and licensing-in versus informal collaboration models involving sourcing knowledge from suppliers or competitors based on non-contractual relationships ([Santoro, Bresciani, & Papa, 2020](#)).

Our study is exploratory in nature and the incumbents' strategies we identified are worth further investigation. We have suggested that the choice between cooperating or competing with entrant platforms largely depends on frictions created between incumbents and challenging entrants, and the competitive pressure exerted by the latter. Such decisions may also be influenced by the nature of competition itself (i.e., whether it is based on technology, product, or both), thereby leading to different incumbent responses. The cooperative dynamics described in the process model we developed illustrate the progressive digitalization of an ecosystem. That process, however, may be influenced to a certain extent by specific industry players acting either as gatekeepers or as facilitators of the ecosystem's digitalization. In traditional industry settings such as manufacturing, it has been suggested that ecosystem transformation is achieved through a process of orchestration of ecosystem partners conducted by industry players acting as ecosystem leaders or orchestrators ([Parida et al., 2019](#)). Similar patterns have also been suggested in less conventional settings such as crowdfunding platforms in which specific actors (core agents) may assume the role of crowdfunding

campaign orchestrators assigning specific tasks to peripheral agents and using the crowdfunding campaign results to influence ecosystem evolution ([Nucciarelli et al., 2017](#)). Within an ecosystem, diverse roles such as keystone, dominant, and niche players ([Iansiti & Levien, 2004](#)) can be assumed which promise to have a relevant impact in shaping cooperative and competitive ecosystem dynamics. Future research can shed more light on this important issue.

Finally, our work depicts a typical process of digital transformation in a sector where traditional incumbents grapple with the technological challenges introduced by new entrants. As a matter of fact, digitalization has already pervaded most industries, and we will soon be facing situations where both incumbents and new entrants present advanced digital infrastructures and capabilities. The industry boundaries which characterized market competition until recent times will shift to ecosystem-like arrangements, where value will be created and captured by engaging with a more heterogeneous set of players than what traditional tenets in strategic management have long assumed. In such cases, the ability to orchestrate competition and cooperation strategically across market segments, technologies, and customer groups will likely become a distinctive factor in firms' competitive advantages. Our understanding of how to create and sustain such a capability is far from being complete, and we hope our study will serve as a stepping stone for those scholars who will engage with this compelling topic and its open questions.

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