

# COMPETING WITHIN AGGREGATORS: COMPETITIVE MOVES IN THE DELIVEROO ONLINE DELIVERY PLATFORM

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**Abstract** Aggregators are platforms that also control a marketplace for the suppliers' innovations. Suppliers competing within aggregators are limited by the technology and governance rules of the platform owner. As a consequence, aggregators influence the type and complexity of competitive moves suppliers can implement. Our research investigates the drivers of suppliers' competitive advantage. We incorporate existing literature on competitive action to identify the categories of moves available to suppliers. Furthermore, we identify three types of orthogonal moves that are unique to competition within aggregators. Finally, we illustrate our advanced categorization in the context of a major food delivery platform. Our preliminary results confirm that suppliers, while bounded to resources exposed by the aggregator, have the opportunity to implement an heterogenous portfolio of moves in their pursuit of competitive advantage. This result calls for empirical research in the context of competition within aggregators in general, and food delivery platforms specifically.

**Keywords:**  
platform,  
marketplace,  
aggregators,  
competitive  
moves,  
online  
delivery  
platform.

## 1 Introduction

Over the last 30 years technology platforms have emerged as critical elements of all technological layers (e.g., operating systems, browsers) and in several application domains (e.g., payments, game development). Aggregators, a type of platform, are increasingly drawing research, media and regulatory attention. Aggregators (1) mediate the relationship between customers and suppliers<sup>1</sup> by managing a marketplace; (2) serve customers at virtually zero marginal costs; (3) exhibit positive cross-side network effects. Examples include Google Search, Amazon Marketplace, Apple iOS, TripAdvisor, Expedia, and Deliveroo. Aggregators rise to prominence by creating superior value for customers. Consider Google Search and the aggregation of demand for online information seeking. As the number of Web pages increased exponentially, the precision of the Google's page-rank algorithm enabled the firm to provide better answers to customer search queries. Google became the de-facto organizer of information on the Web, a valuable service for customers. Whether it is the search for information, the procurement of travel, or the ordering of food, aggregators come to own customer relationships by providing a superior solution to a customer "job to be done" (Ulwick 2002).

The competitive performance of aggregators have received significant attention (see for a review: Mcintyre and Srinivasan 2017; de Reuver et al. 2018). However, we have yet to fully understand how suppliers can successfully compete within aggregators, given the idiosyncrasies they present. First, aggregators create synthetic algorithmic marketplaces that are not bounded by the limitations of the physical world. Being algorithmic, the competitive rules within aggregators can evolve arbitrarily and unpredictably. Second, aggregators mediate the interaction between suppliers and their customers. Unlike the traditional supply-retail relationship, aggregators (e.g., Expedia) intermediate the relationship between suppliers (e.g., hotels) and their customers (e.g., travelers). Because of this characteristic, they are a special case of platforms (see below), in which suppliers are limited by the competitive moves afforded by the aggregators. Third, the algorithmic mediation and the matching mechanisms implemented by aggregators exert pressure toward the commoditization of suppliers. Having to comply with the aggregators' technological prerequisites and governance rules, while being unable to own the

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<sup>1</sup> Suppliers as those organizations that leverage the platform resources to produce digital innovations (i.e., new market offerings, business processes, or models).

transactional relationship with their customers creates obstacles to competitive differentiation by suppliers.

We offer three contributions to the literature. First, we advance a conceptualization of aggregators as a special type of platforms. Second, we identify the classes of competitive actions that suppliers can deploy when competing within aggregators, introducing the notion of platform moves, marketplace moves and outside moves. Finally, we illustrate the above categorization in the context of digital food delivery aggregators. The work is important because the vast majority of constituencies for our research are suppliers and, as aggregators gain prominence, these firms must find ways to compete within their synthetic algorithmic marketplaces.

## **2 Definitions**

### **2.1 Platforms**

We adopt an information systems perspective, defining platforms as a socio-technical systems with a layered architecture that facilitates digital innovation by suppliers through the exposure of digital resources (Parker et al. 2017; Rodríguez and Piccoli 2020). Digital innovation is “the creation of market offerings, business processes, or models that result from the use of digital technology.” (Nambisan et al. 2017, p. 224) Platforms are structurally different from traditional applications because they provide generic resources that heterogeneous supplier communities can leverage and combine to produce their digital innovations (Gawer 2014; Hanseth and Lyytinen 2010). The degree to which a platform enables digital innovation is a function of its “generativity” (Zittrain 2005). We observe different levels of generativity as platforms can diverge in the breath of possible uses, and in the degree to which they facilitate the achievement of desirable objectives. Consider the example of the Windows .NET software development platform. .NET facilitates the development of a broad range of software applications. However, due to its general design, .NET requires significant efforts to develop complex applications in specific domains (e.g., games). On the other hand, the Unity game development platform facilitates the achievement of highly complex, yet narrow, objectives that would be hard to realize by independent game developers using general software development platforms.

## 2.2 Marketplaces

Economist commonly refer to the entity that facilitates the transaction in two-sided or multi-sided markets as the platform sponsor or owner (Eisenmann et al. 2009). Much previous research uses the terms market, marketplace, and platform interchangeably. The concepts are related, but distinct. A market is a specified category of potential buyers, like readers in the market for books. A marketplace (e.g., the Amazon Marketplace) is the space, increasingly digital, where people meet for the purpose of trade. It facilitates the exchange of products, services, and information between buyers and sellers (Pavlou and Gefen 2004).

The recent success of the AppStore and Google Play demonstrates how ownership of a marketplace can be a source of competitive advantage for platform owners. However, it is not a defining prerequisite for a platform to own a marketplace. Windows, the first dominant software platform, did not integrate a marketplace and suppliers were free to distribute their innovation (software applications) independently – some chose OEM partnerships, some retailers, some used mail order or, after the commercialization of the Internet, direct downloads. Marketplaces differ in the degree of control exerted by the owner. In some cases, like Apple, the DRM module in the iOS kernel guarantees full control over the distribution channel of apps through the AppStore (unless the device is jailbroken). In others, like Android, the same platform may host multiple competing marketplaces for the suppliers' digital innovations (Karhu et al. 2018).

Marketplace owners determine the technological prerequisites and governance rules for participation (Ghazawneh and Henfridsson 2015). Where marketplace participants can adopt opportunistic behaviors, the owner also functions as an enabler of trust by protecting customers (e.g., by granting favorable refund policies) or reducing information asymmetry (e.g., by implementing rating systems) (Pavlou and Gefen 2004). Finally, through the implementation of discovery features, such as search functionalities, filtering functionalities, and recommendation systems, marketplace owners impact the value capture potential of all parties (Li et al. 2018).

## **2.3 Aggregators**

An aggregator is a type of platform that integrates a marketplace. It facilitates digital innovations (like platforms) and transactions between suppliers and customers (like marketplaces). Aggregators have three defining characteristics: First, they mediate the relationship between customers (e.g., consumers) and sellers (i.e., suppliers) via synthetic algorithmic marketplaces. Suppliers are incentivized or required to distribute their innovation in the aggregator's own marketplace.

Second, aggregators can serve customers at virtually zero marginal costs. Aggregators standardize interactions between customers and suppliers, thereby reducing the complexity, and cost, of managing transactions. For example, the ordering and fulfillment process in a food delivery aggregator is standardized for all participating restaurants. Membership in the aggregator's platform and marketplace implies respect of technological prerequisites and governance rules by suppliers, rules that are typically algorithmically enforced. This process of adjustment is inherently commoditizing, as it leads to an increase in the comparability of suppliers, and a reduction in the options they have for differentiating their offer.

Third, aggregators exhibit positive cross-side network effects (Katz and Shapiro 1994) because their value creation potential depends on aggregating demand on the customer side and aggregating a range of suppliers on the supply side. Such network effects often engender winner-take-all dynamics leading successful aggregators to command monopolistic positions that force suppliers to join.

## **3 Competing in Aggregators**

The premise of this study is that the emergence of aggregators significantly influences the competitive actions available to suppliers. Unlike traditional marketplaces, organizations that participate in aggregators are impacted by digital technology in two ways. First, they are limited in the extent to which they can innovate by the degree of generativity of the platform they chose. Second, they are bound by the algorithmically enforced marketplace governance rules. It is within these limitations that suppliers craft their competitive actions.

### 3.1 Competitive Actions

Organizations compete by a series of actions designed to recombine resources in the pursuit of improved performance (Henfridsson et al. 2018). A competitive action is “any externally oriented, specific, observable competitive move initiated by a firm to enhance its relative competitive position” (Smith et al. 2001, p. 12). In the IS tradition, competitive actions are enacted through initiatives that depend on the use of digital technologies at their core (Piccoli and Ives 2005). Previous studies have grouped competitive actions into pricing, marketing/promotional, product, product presentation, payment, capacity/scale, service, and operations moves (Ferrier et al. 1999; Li et al. 2019; Yu and Cannella Jr 2007). These studies assume that the competitive environment complexity and dynamics are general features of the industry. However, when firms compete within aggregators, they are subject to the idiosyncratic dynamics explicitly determined by the aggregator (Kapoor and Agarwal 2017). Therefore, suppliers that participate in an aggregator can be subject to different competitive dynamics with respect to that of the industry. To account for this specificity, we add an orthogonal set of three classes of competitive action types that are unique to competition within aggregators: platform actions, marketplace actions and outside actions.

- Platform actions are moves the suppliers enact to create their digital innovation by leveraging the generic digital resources exposed by the platform (Henfridsson et al. 2018). More generative platforms afford higher optionality, and thus provide the suppliers with a wider array of competitive actions. When exploiting platform actions, suppliers seek to create synergy between their innovation and the platform in order to improve their competitive advantage versus other suppliers (Cennamo et al. 2018; Tiwana 2018).
- Marketplace actions are moves the suppliers enact to improve their visibility by influencing the filtering, search, and/or the algorithmic dynamics created by the aggregator. As aggregators scale, and competition between suppliers increases, it becomes of critical importance for suppliers to achieve superior visibility in the marketplace. As customers face high search costs when browsing through a larger number of supplier offerings, superior visibility offers a competitive advantage by improving the probability that customers will find and transact with a supplier (Carare 2012; Li et al. 2018). Furthermore, visibility is particularly important in aggregators, as most exhibit a Pareto distribution, where a small number of suppliers capture the majority of transactions (Garg and Telang 2013).

- Outside actions are competitive moves the suppliers enact independently of the aggregator's platform resources. They do not leverage any platform or marketplace functionalities. Outside actions can lead to significant competitive advantage, as they offer suppliers the opportunity to implement moves with high degree of differentiation potential. Outside actions therefore tend to depend on the general ecosystem and industry conditions, instead of the characteristics of the aggregator. However, outside actions are not insulated from the aggregator's influence, exerted through contractual or algorithmically enforced governance and technical rules. For example, until 2015, Booking.com prevented hoteliers to offer lower prices in competing distribution channels, including the hotel's own website. To limit fraud, Amazon's algorithms trigger account reviews when a seller experience sudden increases in the number and dollar amount of their monthly transactions. As a side effect, such triggers limit the use and effectiveness of aggressive marketing campaign outside of the Amazon marketplace.

Digital food delivery platforms are emerging examples of aggregators, where competition between and within aggregators is evolving rapidly. In the remainder of this paper we use the case of the dominant European player to demonstrate and categorize competitive actions by suppliers (i.e., restaurants).

#### **4 The Case of Deliveroo**

Founded in London in 2013, Deliveroo facilitates the implementation of food delivery by restaurants that would otherwise lack such service. The firm rapid growth has positioned it as one of the major food delivery aggregators in Europe. With more than 5,000 employees it generated over \$300 millions in revenue in 2019. The Deliveroo platform exposes a number of digital resources enabling restaurants' delivery services. Examples include menu configuration tools, order and payment acceptance, and a large network of riders. These resources are accessible to suppliers via a dashboard or through a set of APIs that can integrate with restaurants existing Point of Sale systems (POS). Deliveroo is an aggregator, because its platform integrates a marketplace where diners (customers) can browse through all the restaurant offerings (suppliers). In the UK the number of restaurants delivering to any given location varies between ten and 800. Thus, where the number of restaurants is significant, discovery becomes critical to guarantee relevance. Deliveroo offers filters and search functionalities to navigate through available offerings. Moreover, it implements an algorithmic recommendation system that

ranks restaurants in real-time depending on the probability that customers will place an order to each restaurant.

#### **4.1 Methods**

We selected the case based on two criteria. First, the emergence of food delivery platforms has intensified competition and disrupted long established competitive dynamics in the restaurant industry. Second, Deliveroo is at the forefront of technological innovation in the establishment of advanced platform resources (e.g., restaurant partner API), and sophisticated algorithmic marketplace dynamics governance rules (e.g., predictive restaurant ranking). We followed an iterative approach for categorizing the competitive actions restaurants can enact in Deliveroo. The list is compiled based on unstructured interviews with restaurateurs, the authors' analysis of Deliveroo's technology, and from public sources, such as media reports and Deliveroo's documentation. Each competitive action identified was individually coded by the two authors into one action category and type. Action categories are identified from previous competitive dynamic literature, while actions types are our proposed orthogonal classification. In case of disagreements, the coders discussed the coding until 100 percent agreement was achieved.

#### **4.2 Case Findings**

We identified 24 competitive actions (see Table 1) that restaurants can implement for improving their performance within the aggregator. Our exploratory case analysis provides interesting findings. First, our categorization shows how the majority of platform-based actions available to suppliers in food delivery aggregators (15/24) are designed to facilitate the commercialization of the restaurant's already existing offerings, through product presentation, service, and marketing moves. The aggregator affords only two actions in the product category, that simply include the introduction or removal of a new menu items or their modifiers. Therefore, given the available menu items, restaurants can differentiate their offerings by curating the presentation of the items or by improving their service levels (e.g., low delivery times).

Second, the vast majority of actions we identified are platform-based (16/24). Despite the strategic importance of visibility and discoverability in the Deliveroo marketplace, restaurants only have limited functionalities available to directly impact them. Instead, the visibility is indirectly determined by a combination of platform-based (e.g., percentage of menu items with images) and outside actions (e.g., delivery times), and is determined algorithmically by Deliveroo. Therefore, superior visibility can only be achieved by those restaurants that recognize the importance and pursue the implementation of those indirect factors that influence their visibility.

Finally, we find that Deliveroo does not facilitate the implementation of competitive moves in all categories. Although this is not unexpected, we find that restaurants can circumvent this limitation by implementing outside moves in the capability and scale/operations categories. However, for the payment's category, Deliveroo inhibits the implementation of any competitive actions by fully controlling the payment process. Furthermore, the absence of any platform-based action in the capacity and scale categories indicates a well-defined separation between the restaurants' internal operations and the aggregator.

## **5 Discussion**

Our analysis of Deliveroo shows that to compete within aggregators, suppliers deploy a range of competitive moves aimed at performance improvements. As a consequence, different competitive move configurations can account for heterogeneous organizational performances. In particular, our orthogonal classification of competitive actions offers a new viewpoint for analyzing the strategic potential and effects of competitive actions in the context of aggregators. As competitive moves exhibit varying levels of complexity, suppliers can implement barriers aimed at preempting imitation.

Our analysis suggests that the products or service characteristics might influence the type of competitive actions available to suppliers competing within aggregators. For example, when the product is digital rather than physical, it is easier for aggregators to facilitate the development of new products at scale. Instead, when the product is physical (e.g., a household appliance), the aggregator might focus on facilitating product presentation or service action categories. However, through the process of “infrastructuring” (Constantinides et al. 2018), aggregators can extend their reach

and scope into the physical domain. Deliveroo recently started experimenting with “cloud kitchens,” by allowing restaurants to increase their capacity and scale by renting delivery-only optimized kitchens to them.

The increasing control of the marketplace visibility by recommender systems demands the development of new dynamic capabilities by suppliers. Achieving a visibility advantage requires continuous sensing and adaptation by suppliers, as the aggregators’ algorithms are often proprietary and constantly evolving. For example, Deliveroo recently started promoting those restaurants that use recyclable packaging materials. Quickly adjusting to this requirement with the appropriate outside moves, improves a supplier’s visibility. Furthermore, when direct (e.g., ads) and indirect actions (e.g., time of delivery) for impacting visibility are available, suppliers need to optimize their combination to achieve maximum visibility.

**Table 1: Competitive actions available in Deliveroo**

| <u>Category</u>   | <u>Competitive Action</u>   | <u>Type</u> |
|---|---|-------------|
| Product: Launch new products or modify existing ones.                           | Add or remove a new menu item.  | Platform    |
|   | Add or remove modifiers for an item (e.g., remove/add ingredient).                              | Platform    |
|   | Change food packaging to improve quality.   | Outside     |
| Price: Implement price cuts and sales incentives.                               | Change the price of a menu item/modifier.   | Platform    |
|   | Launch discount, meal deals, or bundles.  | Marketplace |
| Product presentation: Improve the product information provided to customers.    | Add/change a menu item description.   | Platform    |
|   | Add/change a menu item image.   | Platform    |
|   | Change the items order in the menu.   | Platform    |
|   | Add/modify the menu categories (e.g., starters, mains).   | Platform    |
| Service: Change the company's range or level of services provided to customers. | Change the opening hours on the delivery platform.  | Platform    |
|   | Receive reservations (pre-orders) outside the restaurants' opening times.                       | Platform    |
|   | Set the delivery times (only for restaurant that manage their own fleet).                       | Platform    |
|   | Activate "busy mode" to increase the normal delivery times.                                     | Platform    |
|   | Turn-off the delivery service.  | Platform    |
|   | Mark menu items as unavailable.   | Platform    |
|   | Decrease/increase delivery times.   | Outside     |
| Service/Operations  | Manage own delivery riders' fleet.  | Platform    |
| Marketing: Perform advertising and promotions activities.                       | Add/change food category items used as filters to discover the restaurant.                      | Marketplace |
|   | Create a brand page on the delivery platform.   | Platform    |
|   | Launch a virtual brand, that exists only on the delivery platform.                              | Platform    |
|   | Launch promotions increasing traffic to the delivery platform.                                  | Outside     |
| Capacity and Scale: Change the company's capacity or output.                    | Open a "dark kitchen," optimized for delivery, and that has no access to the public.            | Outside     |
| Capacity and Scale/Operations: Change in organizational activity systems        | Increase the kitchen capacity, and/or assign dedicated staff members to fulfill delivery order. | Outside     |
|   | Dedicate front-end staff to manage relationship with delivery riders.                           | Outside     |
| Payment: Provide customers with multiple payment options                        | None.   |             |

## 6 Limitations and future research

Supplier's appropriation of value within aggregators presents many idiosyncrasies that warrant future research attention to fill gaps in our understanding of competition in increasingly digital markets. We contribute to the body of knowledge on platforms and marketplaces by identifying three different types of competitive actions that suppliers can implement when competing within aggregators. However, our initial findings require the analysis of multiple aggregators within and across different industries before the external validity of our categorization is established. Future research should use our initial categorization to empirically investigate those competitive configurations that lead to superior performance of suppliers competing within aggregators. The identification of the three different types of competitive actions (i.e., platform, marketplace, outside) demands empirical investigations to determine possible differences in their relative effectiveness for short and long-term competitive position. Finally, the investigation of visibility as a source of competitive advantage has yet to receive significant attention and focused empirical attention in this area is needed.

### References

- Carare, O. 2012. "The Impact of Bestseller Rank on Demand: Evidence from the App Market," *International Economic Review* (53:3), pp. 717–742.
- Cennamo, C., Ozalp, H., and Kretschmer, T. 2018. "Platform Architecture and Quality Trade-Offs of Multihoming Complements," *Information Systems Research* (29:2), pp. 461–478. (<https://doi.org/10.1287/isre.2018.0779>).
- Constantinides, P., Henfridsson, O., and Parker, G. G. 2018. "Platforms and Infrastructures in the Digital Age," *Information Systems Research* (29:2), pp. 381–400. (<https://doi.org/10.1287/isre.2018.0794>).
- Eisenmann, T. R., Parker, G., and Van Alstyne, M. 2009. "Opening Platforms: How, When and Why?," *Platforms, Markets and Innovation* (6), pp. 131–162.
- Ferrier, W. J., Smith, K. G., and Grimm, C. M. 1999. "The Role of Competitive Action in Market Share Erosion and Industry Dethronement: A Study of Industry Leaders and Challengers," *Academy of Management Journal* (42:4), pp. 372–388.
- Garg, R., and Telang, R. 2013. "Inferring App Demand from Publicly Available Data," *MIS Quarterly* (37:4), pp. 1253–1264. (<https://doi.org/10.25300/MISQ/2013/37.4.12>).
- Gawer, A. 2014. "Bridging Differing Perspectives on Technological Platforms: Toward an Integrative Framework," *Research Policy* (43:7), pp. 1239–1249.
- Ghazawneh, A., and Henfridsson, O. 2015. "A Paradigmatic Analysis of Digital Application Marketplaces," *Journal of Information Technology* (30:3, SI), pp. 198–208.

- (<https://doi.org/10.1057/jit.2015.16>).
- Hanseth, O., and Lyytinen, K. 2010. "Design Theory for Dynamic Complexity in Information Infrastructures: The Case of Building Internet," *Journal of Information Technology* (25:1), pp. 1–19. (<https://doi.org/10.1057/jit.2009.19>).
- Henfridsson, O., Nandhakumar, J., Scarbrough, H., and Panourgias, N. 2018. "Recombination in the Open-Ended Value Landscape of Digital Innovation," *Information and Organization* (28:2), pp. 89–100.
- Kapoor, R., and Agarwal, S. 2017. "Sustaining Superior Performance in Business Ecosystems: Evidence from Application Software Developers in the IOS and Android Smartphone Ecosystems," *Organization Science* (28:3), pp. 531–551. (<https://doi.org/10.1287/orsc.2017.1122>).
- Karhu, K., Gustafsson, R., and Lyytinen, K. 2018. "Exploiting and Defending Open Digital Platforms with Boundary Resources: Android's Five Platform Forks," *Information Systems Research* (29:2), pp. 479–497. (<https://doi.org/10.1287/isre.2018.0786>).
- Katz, M. L., and Shapiro, C. 1994. "Systems Competition and Network Effects," *Journal of Economic Perspectives* (8:2), pp. 93–115.
- Li, H., Fang, Y., Lim, K. H., and Wang, Y. 2019. "Platform-Based Function Repertoire, Reputation, and Sales Performance of e-Marketplace Sellers," *MIS Quarterly* (43:1), pp. 207–236.
- Li, L., Chen, J., and Raghunathan, S. 2018. "Recommender System Rethink: Implications for an Electronic Marketplace with Competing Manufacturers," *Information Systems Research* (29:4), pp. 1003–1023. (<https://doi.org/10.1287/isre.2017.0765>).
- Mcintyre, D. P., and Srinivasan, A. 2017. "Networks, Platforms, and Strategy: Emerging Views and Next Steps," *Strategic Management Journal* (38:1), pp. 141–160. (<https://doi.org/10.1002/smj.2596>).
- Nambisan, S., Lyytinen, K., Majchrzak, A., and Song, M. 2017. "Digital Innovation Management: Reinventing Innovation Management Research in a Digital World.," *MIS Quarterly* (41:1).
- Parker, G., Van Alstyne, M., and Jiang, X. 2017. "Platform Ecosystems: How Developers Invert the Firm," *MIS Quarterly* (41:1), 255+. (<https://doi.org/10.25300/MISQ/2017/41.1.13>).
- Pavlou, P. A., and Gefen, D. 2004. "Building Effective Online Marketplaces with Institution-Based Trust," *Information Systems Research* (15:1), pp. 37–59.
- Piccoli, G., and Ives, B. 2005. "II-Dependent Strategic Initiatives and Sustained Competitive Advantage: A Review and Synthesis of the Literature," *MIS Quarterly* (29:4), pp. 747–776.
- de Reuver, M., Sorensen, C., and Basole, R. C. 2018. "The Digital Platform: A Research Agenda," *Journal of Information Technology* (33:2), pp. 124–135. (<https://doi.org/10.1057/s41265016-0033-3>).
- Rodríguez, J., and Piccoli, G. 2020. "Seeking Competitive Advantage Through Platform-Enabled Resources: The Case of Food Delivery Platforms," in *Proceedings of the 53rd Hawaii International Conference on System Sciences*.
- Smith, K. G., Ferrier, W. J., and Ndofor, H. 2001. "Competitive Dynamics Research: Critique and Future Directions," *Handbook of Strategic Management* (315), p. 361.
- Tiwana, A. 2018. "Platform Synergy: Architectural Origins and Competitive Consequences," *Information Systems Research* (29:4), pp. 829–848. (<https://doi.org/10.1287/isre.2017.0739>).
- Ulwick, A. W. 2002. "Turn Customer Input into Innovation," *Harvard Business Review* (80:1), pp. 91–7.
- Yu, T., and Cannella Jr, A. A. 2007. "Rivalry between Multinational Enterprises: An Event History Approach," *Academy of Management Journal* (50:3), pp. 665–686.

Zittrain, J. L. 2005. "The Generative Internet," *Harvard Law Review* (119), p. 1975.