Governance Strategy for Digital Platforms:
Differentiation through Information Privacy

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Forthcoming in *Strategic Management Review*

Abstract
Digital platforms are organized by some of the world's largest firms to serve multiple inter-connected markets. Facebook is a giant firm that organizes a marketplace, and we use it as an example to illustrate why information privacy should be analyzed as a major dimension of platform governance. This review essay comes at a time when these firms view the information about the users of the firms' products and services as a treasure trove to be exploited. Information privacy, however, is currently not in the definition of platform governance, which has been concerned with who has access to the platform and what interactions among different sides of a platform are allowed. We add information privacy as a new dimension of platform governance, and posit that a platform chooses a quality position through its policy on information privacy. For social media, quality refers to the discourse and veracity of the information exchanged on the platform, and the level of quality hinges on what user data a platform chooses to disclose or conceal. Thus, platforms differentiate on quality through information privacy. One implication for strategists and policymakers is that, while information privacy has been posed as a technical problem, we submit that it is a strategic choice.

Keywords
Digital platforms; Governance strategy; Information economics; Transaction cost economics; Information privacy; Disinformation; Facebook

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"If this is the age of information, then privacy is the issue of our times. Activities that were once private or shared with the few now leave trails of data that expose our interests, traits, beliefs, and intentions. […] Accompanying the acceleration in data collection are steady advancements in the ability to aggregate, analyze, and draw sensitive inferences from individual's data."

--Acquisti, Brandimarte, and Lowenstein (2015: 509), *Science*

1. Introduction

Digital platforms are organized by some of the world's largest firms to serve multiple inter-connected markets. Recently, they have become an increasingly important locus of economic activity, in which a small number of companies—including Amazon, Apple, Facebook, and Google, and Microsoft—exert influence over every dimension of individuals' personal, professional, and political lives (Cusumano, Gawer, and Yoffie, 2019). An example of this outsized influence is Facebook's interference in the 2016 U.S. presidential election. One side of Facebook's platform, app developers, manipulated another side, users (Seetharaman, 2018a). Cambridge Analytica, an app developer on Facebook, took advantage of 300,000 Facebook users who had voluntarily answered a personality quiz and exploited the user data by manipulating voter perception using false information that purposely inflamed social division, hatred and fear.

A platform owner's regulatory decisions about whom to give access to and what actions to allow on the platform comprise the platform's governance strategy. Platform governance, as defined in the literature, is the regulation of access to the platform and of the interactions among

different sides of a platform (Boudreau and Hagiu, 2008; Hagiu 2014). Thus, this manipulation was due to a failure of platform governance. Facebook gave access to Russian actors who mounted a propaganda campaign by creating fake accounts and posting fake news stories. Fundamentally, governance strategy addresses the problem of market failure: if users and advertisers abandon the platform, the exchange of social information and the sale of advertisements cease. In Facebook's case, users could lose trust in the platform as they learn about how they have been manipulated. And if users abandon the platform, advertisers will follow (Gallagher, 2018; Vranica, 2018). The Facebook example thus highlights the market failure problem that platforms face and the role of governance strategy in mitigating that problem.

However, the Facebook example also demonstrates the importance of a third, missing, dimension of governance strategy: information privacy, or the regulation of what information is disclosed or concealed. The aforementioned manipulation took place on the platform because Facebook gave information about its users to app developer Global Science Research who then gave it to Cambridge Analytica (Seetharaman, 2018a). The decision to disclose or conceal information is not a new challenge for platforms. Platforms that broker the exchange of goods, like eBay, have always kept buyer and seller identities concealed because a buyer could otherwise contact a seller directly and cut eBay out of the transaction. However, platforms that broker the exchange of social information and advertisements face very different incentives. For these platforms, the quality of the discourse increases when users reveal their identities, compared to when users conduct digital activities under anonymity. As such, social media platforms encourage users to reveal their identities rather than conceal them. Yet, revealing identify exposes users to information collection.

In this review essay, we aim to explain information privacy as a key dimension of a digital platform's governance strategy. The essay reflects a time when technology firms view information about their users as a treasure trove to be exploited. As Cusumano *et al*. (2019: 187) notes, the Facebook-Cambridge Analytica debacle raises two major questions about platform governance: "What is Facebook's responsibility to monitor and curate the content shared on its platform? And what steps should Facebook take to protect users' privacy and ensure that third-party developers and advertisers are not misusing user data?" Whereas Cusumano *et al*. take a regulatory compliance approach to privacy, we submit that governance strategy is also a matter of competitive positioning, where firms can differentiate on information privacy. That is, we posit that a platform can differentiate from competitors by strategically choosing a level of quality. For social media, quality refers to the discourse and veracity of the information exchanged on the platform, whereas, for goods markets like eBay, quality refers to the amount of fraud that occurs on the platform. The level of quality is thus a strategic choice, through which platforms differentiate from competitors based on the level of trust users have in the platforms. By conceptualizing a governance decision as choosing a platform's quality position, we give strategists and policymakers a lens that connects differentiation and platform governance.

In this sense, our study of platform governance strategy also exemplifies what strategy is. Leiblein, Reuer and Zenger (2018) highlight three unique characteristics of strategic decisions: interdependence across contemporaneous decisions, across the decisions of other economic actors, and across time. Our setting provides an illustration of how this interdependence plays out: the firm's strategic decision is its level of quality. This in turn constrains (or guides) several subsequent governance decisions, all of which impact customer decisions.

Specifically, we introduce our analytical lens by explicating the four areas of theory that underpin differentiation and governance, which draw upon the work of four Nobel prize winning economists. First, research on the economics of platforms builds on the work of Tirole and co-author Rochet. Second, Akerlof's "lemons" problem in information economics, lays the foundation for the role of governance in preventing market failure. Third is research on information privacy, which builds on the work of Stigler. And finally, research on transaction cost economics by Williamson provides guidance on how platforms can implement the level of quality they choose. Together, these areas of research provide the theoretical foundation for the analytical lens we introduce, which has digital platforms strategically choosing a level of quality, then designing the mechanisms of governance to implement that choice.

By connecting differentiation and governance, we also sharpen the distinction between information privacy and data security. While Facebook and policymakers focus on the technical issues of data security as the underlying problem (Wells, 2018), the information that Russians exploited was in fact obtained legally and in accordance with Facebook's privacy policies. No hacking or data theft was involved, unlike the damaging security breaches at Equifax, Yahoo!, and others. The distinction between information privacy and data security is important because the solutions to security breaches are different from the solutions to governance failures. The solutions to a data security problem are primarily engineering in nature and can be used by all firms that collect and store personal data. By contrast, the solutions to the lemons problem are strategic in nature, as platform owners deliberately choose the level of quality of information privacy.

2. Literature Review on Digital Platforms

Digital platforms combine two features that have grown in strategic importance in recent years. "Digital" refers to the Internet's role in connecting distant participants with unprecedented ease. "Platform" refers to firms that serve multiple inter-connected markets in various types of exchange, such as buying and selling goods or producing and distributing information. The economic theory of platforms, also known as two-sided markets, was formalized by Rochet and Tirole (2003, 2006) and has had an enormous influence on digital platforms. When Google and Facebook first built their platforms, which quickly attracted users, they lacked a revenue plan. The theory of platforms suggested that a second market, advertisers, could be a source of income for a service that users had come to expect for free. Thus, Facebook, which was founded in 2004, did not turn its attention to "monetization," or profiting from its many users, until 2007 (McNamee, 2019).

In this section, we briefly review this theory of platforms, along with its intellectual history. We then turn our attention to how the theory can be used by firms. We follow Hagiu (2014) in categorizing strategy decisions into four categories: (1) the number of sides a platform serves, (2) design, which includes features and functionality, (3) pricing, and (4) governance.[1] We review the literature on each of these categories and argue that governance strategy determines the *quality* of a platform's services and can therefore be a source of differentiation. Despite its importance for competitiveness, governance strategy has received relatively less attention as a strategic lever. Our goal is to provide a clear explanation of the theory underpinning platform governance so that the theory can guide strategy formulation.

2.1. Platform history and theory

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[1] An alternative typology is proposed by Evans and Schmalensee (2008), which describes four categories of functionality: exchanges, advertiser-supported media, transaction systems like Visa and MasterCard, and hardware/software platforms (Sriram *et al*., 2014).

Early theory on platforms expanded the idea of network effects, or positive externalities among a firm's customers. Telephones are a classic example—the more people who have telephone, the more useful a telephone is (Farrell and Saloner, 1986; Shapiro and Varian, 1998). These direct network effects make monopolies more likely, so digital platforms like PCs were the subject of anti-trust concerns (Katz and Shapiro, 1985, 1986). In a two-sided market, additional indirect network effects arise if one set of customers benefits from a separate second set of customers. These indirect effects are also known as a cross-platform externality (Parker and Van Alstyne, 2005; Rochet and Tirole, 2006) and are positive consumption externalities, where one side of the platform is a complement to another side (Boudreau and Jeppeson, 2015). Given these externalities, platforms tend toward monopoly or winner-take-all outcomes (Schilling, 2002; Gawer and Cusumano, 2002; Eisenmann, Parker, and Van Alstyne, 2006).

Monopoly, however, as explored in the empirical literature, is limited under many conditions (Caillaud and Julien, 2003), such as heterogeneous preferences (Shankar and Bayus, 2003; Lee, Lee, and Lee, 2006) or low costs of multi-homing (participating on multiple competing platforms) (Zhu and Iansiti, 2012; Bresnahan, Orsini, and Yin, 2015). Nevertheless, the possibility of winner-take-all motivates grow-big-fast goals (Hagiu, 2014; Eisenmann, Parker, Van Alstyne, 2006; Parker, Van Alstyne, and Choudary, 2016).

2.2. Number of "sides" to a platform

The first category of strategy decisions in Hagiu's (2014) taxonomy is the number of sides that a platform chooses to serve. The complementarity between two sides of a platform is a distinct feature in many traditional businesses such as newspapers, where the more subscribers a newspaper has, the more valuable the newspaper is to advertisers. However, important digital platforms, such as personal computers (PCs), connect three sides: end-users, third-party software

developers, and computer makers (Hagiu, 2014). The decision to serve a given side of a digital platform is a strategic one. For example, Apple's personal computer platform does not involve third-party computer makers; instead, Apple makes all of its own computer products itself (Cusumano, 2012). While the early literature was based on two-sided examples like newspapers, the literature has extended beyond two sides to encompass more than two sides, hence "multi-sided platform."

The formal analysis of the number-of-sides question starts with whether to serve two sides or just one. By creatively reimagining a firm as a platform, Hagiu and Wright (2015a) and Cusumano (2012) compare a two-sided market to a one-sided firm. For example, a professional services firm might organize as a platform by connecting service providers (e.g., lawyers, hairdressers), on one side, and service users, on the other side. Alternatively, a firm might hire service providers as employees, and thereby, organize as a one-sided firm. Haigiu and Wright (2015a) compare vertical integration with contractors in their ability to use mechanisms like bonuses, variable fees, and marketing. Retailers face related issues (Hagiu and Wright, 2015b). Factors, such as superior information or marketing capabilities for specific products, represent cost differences that affect vertical integration. Thus, in both studies, Hagiu and Wright examined the firm's decision whether to form a platform or be vertically integrated.

2.3. "Design"

A second category of strategy decisions relates to the features that a platform chooses to provide. The theory behind such decisions is fairly limited and mainly concerns cost. "For most of these features, the decision whether to include them is amenable to a straightforward cost-benefit analysis: If the cost of building and implementing is less than the value created for the multiple sides served, include them" (Hagiu, 2014: 5).

However, the cost-benefit analysis can be complicated by platform-related considerations that go beyond straightforward product-design decisions. If a platform adds a feature that a customer is currently providing, the platform comes into direct competition with one of its sides. An example of this is observed in the PC industry. When Microsoft took features provided by third-party software developers and incorporated them into its operating system, it "enveloped" the product of one of its customers (Eisenmann, Parker and van Alstyne, 2011). Factors such as economies of scale and scope, substitutability and complementarity are modeled in their game-theoretic analysis of envelopment.

In practice, digital platforms can rapidly test new features and design changes using randomized control trials. Burtch, Ghose, and Wattal (2015) use an experimental research design to examine how changes in "privacy" options affect user donations on a crowdfunding platform. In this case, users are given the option to reveal their identity and the amount they donate.

In both the study of envelopment and the study of privacy options, design strategy overlaps with other categories of strategy. Envelopment presents a conflict with the strategy decision about which sides to serve, while privacy options concern both design strategy and governance strategy.

2.4. Pricing strategy

The pricing of services on a digital platform takes into account cross-platform externalities mentioned above (Rochet and Tirole, 2003). For instance, in the case of magazines, the price of a magazine balances the incentives of advertisers with the preferences of the magazine readers (Kaiser and Wright, 2006). Advertisers value readers more than readers value advertisers, so advertisers subsidize readers; in the extreme, the price of magazines is set to zero, and the magazines are given away for free (Parker and Van Alstyne, 2005). This use of subsidies can

look like predatory pricing or market power if one-sided market logic is applied to two-sided markets (Wright, 2004). In the modern, online counterpart, a digital platform decides whether to charge advertisers based on the number of "clicks" or "actions", such as "email sign-ups, downloads, sales leads, or purchases" (Hu, Shin and Tang, 2016). The trade-offs and incentives of these pricing mechanisms are analyzed in a formal model, where "actions" put pressure on the platform to deliver high-quality customers, while "clicks" put the onus on advertisers to close the deal.

Competition in platform markets also affects pricing. Theoretical models examine platforms' ability to price discriminate while taking into account structural parameters of platforms, including demand, the strength of the cross-platform externalities, and whether one or more sides multi-home (Armstrong, 2006; Liu and Serfes, 2013). Empirical studies nicely illustrate the complex issues developed in theoretical models. For example, Craigslist offers a service that competes with newspaper classified advertising. Craigslist's entry into a newspaper's market causes a cascade of effects. First, newspaper revenues drop (classified ads previously accounted for 40% of revenues), causing newspapers to raise subscriber prices which in turn reduces the number of subscribers and subsequently the value and revenue of display ads (Seamans and Zhu, 2014). In the sports-card trading market, pricing is a complex interaction of competition and cross-platform effects between customers and dealers (Jin and Rysman, 2015). Customers enjoy lower entry fees when there are competing sports card conventions, but dealers do not, because dealers multi-home whereas customers do not.

2.5. Governance strategy

Governance strategy, according to Hagiu's (2014) definition, involves two sets of decisions: rules about who may access the platform and rules about what participants may do on

the platform. Together, these decisions address a "lemons" problem and Boudreau and Hagiu (2009) describe numerous cases in which platforms improved the user experience by strategically limiting access or restricting user actions. The use of governance to differentiate a platform from competitors is thus one way for platforms to co-exist and compete. Halaburda, Piskorski and Yildirim (2018) apply this to a dating platform, in which one platform restricts access to the platform to provide users a higher quality experience and outcome, thereby competing against platforms that do not restrict access.

However, most of the literature on platform governance focuses on openness, not differentiation. Boudreau (2010, 2012) examines two dimensions of "openness" that correspond to Hagiu's definition of governance strategy. The first dimension is openness in terms of access, where participants like app developers or hardware manufacturers are allowed to enter a side of the platform. A second dimension of "openness" has to do with how much control users have over the design of the platform itself. An open source platform, for example, gives substantial control over platform design to users. One hypothesis is that openness, or open access and user control, will attract large numbers of users very quickly. But Boudreau's (2010) empirical study of personal digital assistants (PDAs) finds the opposite. The rate of growth falls as openness increases. One reason may be that greater openness is actually weaker governance: everyone can access the platform and users control the platform.

Indeed, much of the literature treats governance as regulatory compliance or as a technical problem rather than as a strategic matter. A review article by Rysman (2009) makes no mention of governance as a strategic decision, and instead discusses "openness" as the number of sides served and regulation as a problem of anti-trust. That said, technical issues around the lemons problem pose significant challenges and are addressed in three streams of literature. The

first stream is auction design. Digital platforms provide an opportunity to empirically examine auction design. Using eBay data, Lewis (2011) examines the level of disclosure in eBay's market for used cars, while Tadelis and Zettelmeyer (2015) find quality rankings of cars helpful because buyers are heterogeneous in their demand for quality. Yin (2007) analyzes whether prices converge on the true common value of a good given the low number of buyers that typically bid on eBay. She finds there is only partial convergence and underpricing remains.

The second stream studies reputation systems as a technical solution to the lemons problem. Dellarocas (2003) looks at reputations as a way to mitigate information asymmetry, and Elfenbein et al. (2015) find positive effects for "reputation badges" on eBay. Hui et al. (2016) show that the addition of eBay's buyer-protection policy gives buyers more confidence to make purchases and serves to discipline sellers. These findings suggest that the reputation of sellers and of the platform itself can be improved through a variety of technical solutions. Moreover, reputation is subject to externalities, as when sellers' reputations improve the platform (Nosko and Tadelis, 2015). However, could sellers manipulate their reputations by paying buyers for positive reviews? Applying signaling theory and conducting a hypothesis test with data from Taobao, Li et al. (2018) find that only high-quality sellers, not low-quality ones, would pay buyers for reviews.

The third stream is design experimentation. Experimentation in platform design has been driven by the opportunistic behavior and false information of platform users. For example, 16% of restaurant reviews on Yelp are fake and the number is growing (Luca and Zervas, 2015). Gavish and Tucci (2006) offer a litany of ways that sellers cheat buyers on eBay. Tadelis (2016) reviews a long history of papers, revealing the persistent problems with platform design, trial and error, and the cat-and-mouse game that platforms must play against users who continuously try

to game the system.

In addition, it is worth noting a separate literature on the stock market that covers much of the same ground as the aforementioned economics literature mainly because stock exchanges are also market venues that involve auctions. However, with some exceptions (Cantillon and Yin, 2011), research in finance does not view stock exchanges as two-sided, which is a problem for policy analysis. Diamond and Kuan (2018) analyze stock exchanges as a two-sided lemons market and show that different governance strategies result in different mechanism choices and market outcomes. Gode and Sunder (1997) analyze the efficiency of double auctions and Weber et al. (2009) discuss different goals as affecting governance and performance. Stock markets are a setting in which information is understood to be a key element, whether in regulated exchanges (Simon, 2001) or unregulated over-the-counter markets (Dang and Felgenhauer, 2012). The lemons problem can be mitigated by certifying quality (Kovner, 2012; Diamond and Kuan, 2007) or exacerbated by weak rules (Eberhart and Eesley, 2018).

Note that in the platform context, "governance" relates to access and permitted activity, to which we add a third dimension, privacy. This differs from the dimensions of governance that Williamson (1991a) refers to, namely, administrative controls, incentives, and the supporting legal regime. In platforms, governance strategy addresses the lemons problem, while the more general notion of governance addresses the ability of a hierarchy to implement a strategy. For the purposes of this study, we do not discuss the more general notion of governance. However, we return to this in our discussion of future research.

3. Theoretical Foundations for Platform Governance

13

The primary focus of the literature on platform governance has been on how to generate trust through user reviews and quality rankings in order to increase the size of the market. This emphasis is driven by two assumptions about digital platforms. The first is the "death of distance"—that the distinguishing feature of digital platforms is their ability to overcome information incompleteness, e.g., by connecting far-flung users who would not otherwise connect. The second assumption is that, because of the death of distance, the most appropriate reputation mechanism is crowdsourcing, in which the platform's users provide reviews and rankings of other users. Thus, the scale and reach of digital platforms are thought to make them different from other platforms. However, we submit that the same strategic issues apply to platforms whether digital or traditional.

In this section, we discuss the theories that we propose for understanding platform governance: information economics (IE) and transaction cost economics (TCE). IE casts the lemons problem as a lens with which to view the conundrum of market failure that digital platforms face. High quality information is needed to overcome the lemons problem and platforms choose how extensively to do so. In principle, information quality could conflict with privacy, since privacy means less disclosure and less information. However, we as we argue below, information quality and privacy are separate dimensions. Where IE is less useful is in guiding managers, because the solutions derived from IE, such as disclosure, reputation, and certification (or vetting), are too generic. Therefore, when a manager chooses a level of quality to produce, the question remains of how to implement this choice.

TCE addresses the question of implementation by generating the mechanisms of governance that platforms can choose from, such as vertical integration. TCE proposes mechanisms that involve "principally spot markets, various long-term contracts (hybrids), and

hierarchies," which correspond to low, intermediate, and high levels of quality (Williamson, 2005: 1). In general, TCE asks managers to identify possible opportunistic behavior, imagining the worst-case scenario or learning from history. Managers then must decide how strategically important these hazards are and identify the trade-offs involved in addressing them. Because the set of possible solutions includes crowdsourcing at one extreme and vertical integration at the other, the analysis takes place at the boundary of the firm. As such, the "theory of the firm must define …, whether a given transaction is within one firm or between two… and…what tradeoff exists between integration and non-integration, so that the theory predicts integration for some transactions and non-integration for others" (Gibbons, 2005). Following Gibbons, we posit that some firms may choose integration while others may choose non-integration or other alternative modes. Platform quality is a strategic decision that imposes tradeoffs. Table 1 summarizes the role of these two theories in platform governance and the following sections provide further review of the theoretical foundations.

[Insert Table 1 about here]

3.1. Information Economics

The classic "lemons" problem begins with Akerlof's (1970) article by that identifies information asymmetry as a source of market failure, where low quality drives out high quality. Akerlof uses a stylized used-car market to illustrate how a market might fail if buyers have so little information about the quality of a particular used car that they must assume quality is average. Sellers with above-average used cars withdraw from the market, thus lowering the average quality of the remaining sellers. Buyers update their expectations to the new, lower, average, and the process repeats until only the worst used cars remain. Importantly, the paper explicates a market-failure consequence of asymmetric information, and explains how quality-

15

assurance mechanisms seen in real life (e.g., warranties, guarantees, brands and chains, licensing or certification) serve to mitigate the lemons problem.

An early related literature examines the quality-assurance mechanisms further. Nelson (1970) takes a marketing perspective by focusing on various properties of consumer goods. Search costs, frequency of consumption, and whether the focal good is a durable good and an experience good (i.e., one that must be consumed in order to determine its quality) all affect the producer's decision to invest in branding and advertising. This explains why consumers place a high value on information about certain goods likemovies or durable goods: they are infrequently consumed experience goods. Grossman and Hart take a contracting approach and consider whether quality is observable and verifiable (i.e., provable in court) *ex post*, in which case, sellers will disclose information about quality (Grossman and Hart, 1980), or whether quality is observable but not verifiable, in which case a warranty is used (Grossman, 1981).

Empirical studies seek to establish the prevalence of the lemons problem. Studying used-trucks, Bond (1982) finds no difference in maintenance costs for trucks between those that were re-sold as used-trucks and those that were never re-sold. Based on maintenance data, then, used-trucks are not "lemons." Studying used-cars, Genesove (1993) finds that dealers, who also sell new cars and thus have a reputation to maintain, receive higher prices for used cars than used-car-only firms, suggesting that reputations can mitigate the lemons problem. That said, in both studies, buyers make use of available information, such as age and mileage, which can be observed (Pratt and Hoffer, 1984; Bond, 1984) and institutional details like whether the dealership also sells new cars (Genesove, 1993).

The IE literature on lemons can be interpreted in two ways, as market failure or as market rescue. In the former, market failure, the lemons problem is an explanation for weak or

nonexistent markets, and the literature proposes ways to improve or create markets. In the latter, market rescue, the lemons problem is an explanation for why certain real-world institutions exist, they enable otherwise failed markets. For example, Nelson (1970) argues that the reason newspapers allocate an inordinate amount of space to movie and book reviews is to address information asymmetry for infrequently consumed experience-goods.

Both market failure and market rescue logics are useful for platform governance strategy. In the case of market failure, an entrepreneur organizing a platform might ask, "Why is there no market for X, and how might I address that?" whereas with market rescue, she might ask, "In the market for X, is there a lemons problem that the incumbent has only partially solved where I can do better?" The second question is particularly interesting because when the lemons problem has been solved well, amnesia about the defeated lemons problem may set in. In used trucks, Bond (1982) acknowledges that, "one explanation for this finding [of no lemons among used trucks] is that the counteracting institutions of the type discussed by Akerlof may have developed." Diamond and Kuan (2018) make a similar argument with stock exchanges where underwriter-owners of the NYSE have an incentive to solve the lemons problem well. But broker-dealers, who own the Nasdaq, do not; they differentiate from the NYSE, by producing lower quality or higher volatility. Similarly, new car dealers amortize a good reputation across sales of new and used cars, unlike used-car-only dealers (Genesove, 1993). Governance strategy is thus a way for firms to differentiate, through the level of quality. There is a policy issue as well, though, because firms may choose low quality that is unacceptable to policy makers.

This emphasis on lemons is consistent with recent work relating market imperfections with competition and regulation (Oberholzer-Gee and Yao, 2018). In their analysis, however, market imperfections, such as information asymmetry, attract entry, so competition mitigates the

imperfections substantially over time. Any remaining imperfection attracts the attention of regulators, who then act to further reduce or eliminate the imperfection. This can be problematic for firms seeking to profit from imperfections.

Among digital platforms, the lemons problem applies most obviously to goods platforms like eBay that facilitate the exchange of used goods. But the abstract model of the lemons problem is also applicable to information goods such as videogames. Low-quality videogames for the Atari game platform caused the videogame market to collapse. Nintendo solved the problem through "draconian governance rules," which ensured high quality for all games on its console (Hagiu, 2014: 76). This focus on quality generates organizational solutions to governance, like draconian rules, which guide technical fixes. But this applies to social media platforms where (dis)information is exchanged because they share the same basic problem: (1) information asymmetry between parties on the platform; (2) an incentive to misrepresent the quality of goods on the platform; (3) user trust in the platform; and (4) market failure.

Research on information privacy is a separate subject of study across multidisciplinary fields including economics, law, sociology, political science, information system, and business ethics. Stigler (1980) and Posner (1981) famously argued that privacy can lead to allocation inefficiencies and is therefore undesirable in the absence of externalities or explicit preferences for privacy. Viewing privacy as concealment of information, Posner (1978, 1981) asked, "Why would someone want to conceal a fact, except to mislead others in transacting with him? Admittedly, *why* people should want to suppress such facts is mysterious from an economic standpoint." Posner's setting is the labor market, in which employers search for employees and employees search for employers. The efficiency of search in the labor market is reduced when

employees' personal characteristics such as honesty, diligence, loyalty, and good physical and mental health are concealed from the employer.

The research on the economics of information privacy has focused on the trade-offs arising from protecting versus sharing personal data. The literature has identified at least three mechanisms though which the information asymmetry between data subject and data user leads to inefficiency. First, matching is less efficient with less information. For example, a privacy policy that limited the disclosure of health information could prevent an employer from matching healthy employees with the most extensive training. Second, market exchange is less efficient with less information. For instance, the market for insurance can face severe adverse selection when information about a customer is withheld from insurance companies. Lastly, incentives to invest in productive activities are reduced if one cannot reveal one's productivity, as is the case with a policy that prohibits business school students from revealing their grades to potential employers. This policy would discourage students from getting good grades.

However, the idea that privacy is meant only to mislead has been challenged by Hermalin and Katz (2006) who analyze the efficiency of different privacy regimes. They find that privacy can be socially desirable under two conditions. First, revealing information to a potential trading partner could lead the partner to act in a way that would negatively affect the revealing party. Second, a person might have a taste for privacy *per se*, even if there are no consequences of the first kind. An example of the first situation, Diamond and Kuan (2018) describe the New York Stock Exchange, where buyer and seller identities are concealed because the identities of buyers and sellers could distort stock prices. At the same time, the NYSE manages the high levels of disclosure companies provide in order to list on the exchange.

This example is consistent with Hermalin and Katz's (2006) model, which shows that privacy can be efficient even when there is no preference for privacy. But is there a way to assign property rights to personal information that leads to an optimal level of privacy or disclosure? They find that to be effective, a privacy policy may need to ban information transmission or use, rather than simply assign individuals control rights to their personally identifiable data.[2]

Other research on the possible benefits of privacy include Calzolari and Pavan (2006), who evaluate information disclosure between two principals sequentially contracting with a common agent who strategically decides whether to report her true type. They show that the effect of privacy on welfare is ambiguous. Hui and Png (2006) provide a survey on the economics of privacy and argue that externalities generally play an important role in the collection and exploitation of consumer information. Casadesus-Masanell and Hervas-Drane (2015) analyze how firms that provide online services, such as the email services from Google or Microsoft, balance off revenues from charging the consumers and revenues from disclosing consumer information (e.g., selling consumer information to advertisers).

3.2. Transaction Cost Economics

The other theory that we propose for understanding platform governance is TCE, which also deals with market failure resulting from opportunistic behavior (Williamson, 1996). But Akerlof's setting is a spot market for goods, while Williamson's is the market for services, where a buyer contracts with a seller to perform tasks. This shift in market allows the theories to focus

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[2] Specifically, Hermalin and Katz (2006) establish conditions under which allowing households to reveal personally identifiable information would increase total surplus. More information allows firms to make customized offers to households, facilitating efficient transactions that would otherwise fail to occur. However, there are conditions under which intermediate increases in information leads to exclusion, where privacy narrows the pooling of household types and as a result, households of certain types suffer price discrimination.

on different hazards. In IE, the main problem is *ex ante* hazards associated with information asymmetry: market failure arises when sellers withdraw from a goods market because buyers anticipate *ex ante* misrepresentation by sellers. With TCE, the primary hazard is *ex post* opportunism (Reuer, 2009). Commonly known as "hold-up," buyers may refuse to compensate sellers for project-specific investments that the sellers make in fulfillment of the contract. The sellers may be stuck with these project-specific investments because these "specific assets" cannot be redeployed to projects with other buyers. Anticipating this, sellers decline to enter any agreement involving project-specific investments. "Thus, whereas insurance is the paradigm problem for the economics of information, vertical integration is the paradigm problem for governance" (Williamson, 2005: 2, footnote 4).

Although the behavioral cause of market failure differs between TCE and IE, both consider the same features of a transaction, especially how frequently the good or service is purchased, as affecting the severity of the problem. Both theories also highlight the importance of mechanisms such as reputation that can prevent market failure. Furthermore, both focus on discrete outcomes, such as contract failure or market failure.

In addition, like the IE literature on lemons, TCE can also be understood according to two logics: hazardous constraints or strategic differentiation. In Williamson's explication of market failure, transactions have exogenously determined features that make contracting hazardous. For example, infrequently purchased goods that involve uncertainty and firm-specific investment are hazardous to contract for, whereas frequently purchased goods and services can often be purchased on a spot market where sellers can invest in a reputation and buyers can learn about sellers. A response to exogenous hazards is vertical integration. Rather than contract through the market, a firm makes the infrequently needed, firm-specific goods in-house. But a

strategic differentiation logic gives rise to this same outcome. Suppose a firm chooses to differentiate from competitors by making a particular input or feature unique to the firm. Because of its uniqueness, sellers would be concerned about hold-up and would therefore refuse to develop and produce that firm-specific input or feature. As a result, the firm must produce the firm-specific input or feature in-house. The same vertical outcome occurs, but in this case, the firm chooses which aspects of its product to make unique. The hazard is therefore not exogenous, but rather endogenous to the firm's strategy.

Related work by Bresnahan and Greenstein (2014) addresses these themes of organization and in-house production in platforms. They, too, argue that governance structures and organizational hierarchy are key strategic variables. However, their emphasis is on the rate and direction of innovation. Organizational hierarchy improves the coordination of a platform's many moving parts and ranges from minimal coordination (as observed in open source platforms) to intensive coordination (as observed at a firm like Apple, which tightly controls its platform). Yet, there is a trade-off between technological "openness" and "exploration" of new technical solutions. "More hierarchical systems increase the degree of coordination, while less hierarchical systems increase the extent of exploration" (p. 477). Consistent with Bresnahan and Greenstein (2014), we assume that the firm organizing the platform is an organizational hierarchy. However, the focus of our dual theories goes beyond technical issues. Quality is treated in their study as a technical issue that can be solved with software innovation. By contrast, we highlight platform quality as a strategic decision about how well to solve the lemons problem with governance rules that the firm chooses. The theoretical foundation that we propose addresses broader strategic questions about which markets to enter and how to compete through rules of access and interaction.

To apply TCE to platform governance strategy, we use the latter, strategic logic of TCE. First, the firm assesses which aspects of platform governance are strategically important and should therefore be made unique. For example, high-quality sellers are important to attracting buyers, according to a field experiment on eBay (Nosko and Tadelis, 2015). Thus, seller quality might be important enough that the platform vets sellers and restricts access in-house. In other cases, privacy is necessary for transactions to work, such as with stock exchanges, ombudsmen, medical internship matching market and more. If these functions are particularly important, they may have to be designed and implemented in-house.

This interpretation of TCE departs from Williamson's. He argues that "economizing," which is achieved by minimizing transaction costs, is the best strategy (Williamson, 1991b). Instead, we propose two observationally equivalent, equifinal paths to the same efficient outcome. On the one hand, certain transactions are hazardous and must be performed in-house. On the other hand, a firm strategically chooses to make a particular product feature unique; that feature's uniqueness makes it too hazardous to outsource. In both paths, whether the hazard is exogenous or endogenous, the governance mode is vertical integration. Focusing on strategic differentiation, which is the aforementioned second logic of TCE, we highlight that strategizing precedes—and drives—economizing.

This view of strategizing is especially fitting when a platform faces competition by an incumbent. In that case, a platform must examine competitors' governance strategies. For example, US stock exchanges differentiated on the basis of quality (Diamond and Kuan, 2018). The NYSE was the incumbent that solved the lemons problem efficiently, but doing so required the NYSE to be highly selective about which firms would be allowed to list their stocks for sale on the NYSE. The highly restrictive access rules (or listing standards) rejected many firms

seeking to raise capital on the NYSE. This created an opportunity for the Nasdaq to enter with much lower listing standards to serve lower-quality firms.

These choices, about how to implement a differentiation strategy, are explained by TCE, which provides a step-by-step approach for comparing and selecting mechanisms of governance. The first step starts with managers trying to anticipate what could go wrong with an exchange. Identifying the opportunistic behavior that might occur involves imagining the worst-case scenario or learning from history, as Nintendo learned from Atari. The second step generates a menu of governance mechanisms using a make-or-buy analysis. For instance, in deciding what users are allowed to do on a platform, a "make" in-house mode would involve employees of the platform policing user actions, whereas a "buy" mode would involve crowdsourcing, in which users police one another according to community standards of conduct. In Williamson's (1996) formulation, vertical integration and outsourcing are two polar ends of a spectrum that covers intermediate organizational forms, or "hybrids", such as networks, alliances, joint ventures, etc. In fact, digital platforms can crowdsource information gathering from its users, which is an extreme form of outsourcing.

The third step compares the costs and benefits of the various governance mechanisms. According to TCE, mechanisms that require more engagement by the firm are costlier. Thus, in terms of cost, vertical integration is the costliest, hybrids are less costly, outsourcing is even lower cost, and crowdsourcing is the least costly.

The governance mechanisms derived from TCE are also particularly applicable to information privacy because the mechanisms so often take the form of credible commitments, in which one party ties its own hands. For example, a platform might commit to not collecting

certain types of personally identifiable information. FireFox and Duck-Duck-Go web browsers preserve user privacy by not collecting user identity and location data.

4. Facebook and How Digital Platforms Strategically Choose the Level of Quality that Their Users Experience

We now return to Facebook, the example that we started with in the introduction, to examine how a platform can use the theories presented above to articulate platform governance questions. We have argued that the lemons problem is a useful way to think about platform quality. And quality, in turn, affects how much users value the platform. Because the original setting for the lemons problem was the used car market, online goods markets like eBay were a natural fit for empirical studies, as discussed above. But social networks are also subject to a lemons problem, which Boudreau and Hagiu (2009: 171) describe as "minimizing negative interactions on its platform, ranging from irrelevant interactions…all the way to fraudsters and illicit activity." Thus, in their example of early Facebook policy, restricting access to university students grows the size of the platform through a network effect: users want other users to be high-quality.

However, the impact of governance decisions on platform quality is not limited to restricting access. Quality is also driven by cross-platform effects and privacy. The manipulation of Facebook users by Cambridge Analytica illustrates the problems that can occur between one side of the market, in this case app developers, and another side of the market, users. The deceit and manipulation in this case have outraged users who are losing trust in the platform (Gallagher, 2018; Vranica, 2018), regulators, and even some Facebook insiders.

Early investor Roger McNamee (2019) has written a scathing critique of Facebook executives and their strategic decisions: "the world will recognize that the value users receive

from the Facebook-dominated social media/attention economy revolution masked an unmitigated disaster for our democracy, for public health, for personal privacy, and for the economy. It did not have to be that way." Even Facebook co-founder, Chris Hughes, has called for Facebook to be broken up because too much power is concentrated in CEO Mark Zuckerberg's hands. "Mark alone can decide how to configure Facebook's algorithms to determine what people see in their News Feeds, what privacy settings they can use and even which messages get delivered. He sets the rules for how to distinguish violent and incendiary speech from the merely offensive, and he can choose to shut down a competitor by acquiring, blocking or copying it," (Hughes, 2019).

Below, we examine the three governance decisions that platforms must make and how Facebook dealt with them: (1) Access—who may access the platform, (2) Actions—what they may do on the platform, and (3) Data disclosure—what information is disclosed or concealed. We use IE to articulate the strategic problem and TCE to generate options for the platform.

4.1 Access: Fake identities

One of Facebook's terms of use is that users must use their real name. A user can be removed from Facebook for violating this rule. However, Facebook does not verify users' names when they join. Instead, users are asked to report other users suspected of not using their real name and then Facebook reacts to reports of violations. Thus, Facebook crowdsources the verification and monitoring of user identities.

Cambridge Analytica used fake names and then posed as trustworthy users. Their goal was to fool users by posing as legitimate, likeminded individuals or organizations and then inflame social divisions among Facebook users (Seetharaman, 2018a). Because of their deception, users were unable to detect false names.

Facebook chose crowdsourcing, which is a low-cost and ineffective option. But what other options might Facebook have used? The next-lowest cost option is outsourcing. Facebook could have outsourced user-identity verification and enforcement to specialized firms. For example, in a different incident, Iranians surreptitiously promoted their interests using fake identities. But this fraud was discovered by a specialized firm. "Facebook first learned about a network of bogus Iranian pages from U.S.-based cybersecurity firm, FireEye…the pages sought to promote Tehran's interests, including 'anti-Saudi, anti-Israeli and pro-Palestinian themes'" (Seetharaman and Volz, 2018). The next-costliest option is a "hybrid form" that is intermediate between outsourcing and in-house production, such as a joint venture or consortium with other firms to tackle user-identity verification. Currently, Facebook has publicly called for other social media firms to share information about fake accounts, but has made no real effort to create a hybrid organization. And finally, Facebook could vertically integrate the identity-verification function.

4.2 Actions: Fake news

Part of Cambridge Analytica's method for sowing discord among voters was to disseminate fake news stories (Seetharaman, 2018a). Cambridge Analytica succeeded because Facebook cannot detect the violations of its terms of service. This is due to Facebook's decision to crowdsource this governance activity, asking users to monitor and report violations. As with identify verification, crowdsourcing of rule enforcement is also ineffective.

What are some other options? The next most costly option would be to outsource the monitoring and verification of content. For example, Facebook paid FactCheck.org and the Associated Press to identify and debunk fake news (Wells and Alpert, 2018). A costlier option

would be a hybrid organization, in which Facebook works with other firms or government agencies to prevent, detect, or otherwise address fake news.

Finally, the most engaged and costly option is vertical integration. One example of vertical integration is Facebook's in-house monitoring of content. After the Cambridge Analytica case came to light in early 2018, Facebook intensified its efforts to address the integrity of the information contained on its platform. "The shift we made from reactive to proactive detection is a big change, and it's going to make Facebook safer for everyone over time," according to Mark Zuckerberg (Seetharaman and Volz, 2018). Thus the strategic choices are the level of quality and therefore the degree of engagement, in this case in-house production. Facebook is now committed to creating algorithms that detect non-compliance, as "the vast majority of Facebook's efforts against fake news are powered by artificial intelligence, not humans" (Wells and Alpert, 2018).

4.3 Data disclosure: Transferring data to other data users

For the campaign interference to occur, user data had to move from Facebook to several different entities, most of which were unauthorized. Facebook had no means of detecting or enforcing violations of most of their governance rules and the ones related to data management and privacy were no different. In fact, Cambridge Analytica's possession of data was reported by a whistleblower and would otherwise have gone undetected. Efforts to address this gap have met with failure. "Facebook Inc.'s internal probe into potential misuse of user data is hitting fundamental roadblocks: The company can't track where much of the data went after it left the platform or figure out where it is now" (Seetharaman, 2018b).

A related problem is data deletion. Attempts by Facebook to have data deleted by app developers have also been met with a lack of cooperation. "Facebook said it had received

assurances that the improperly accessed data had been deleted. The company later learned that wasn't true and couldn't independently confirm what data had been scrubbed" (Seetharaman and Bindley, 2018). Even legal contracts are woefully incomplete. "A Facebook spokesman said the parties, including Cambridge Analytica, entered legal agreements on the deletion, but Facebook couldn't independently verify that it was scrubbed…Facebook said it learned several days ago that not all the data was deleted" (Seetharaman, 2018a).

What are Facebook's options? Table 2 presents various governance mechanisms derived from TCE for digital platforms. As with other decisions in designing a governance strategy, they range from low-quality solutions that fail to comply with government regulation to high-quality solutions that go beyond regulatory compliance. Facebook must decide what role privacy plays in differentiating from competition. Its current low-quality solution involves crowdsourcing, asking the platform's customers to self-report, while Facebook never audits or enforces its policies. At the other extreme, vertical integration could involve verifying the accuracy of the information and publishing only approved information, and could also disclose verified information about Russian agents posing as users (while also concealing information about users). Apple is an example of a higher-quality solution. Apple app developers are subject to stringent standards about what their apps may do and what data is disclosed to them about users.

[Insert Table 2 about here]

Other possible governance mechanisms include outsourced data centers that manage the disclosure or concealment of user data. The US Census Bureau operates data centers that grant access selectively to researchers after an FBI background check. Users must access the data center in person to perform pre-authorized queries. A hybrid solution might involve a network of third-party agents that can verify data deletion or anonymization, perhaps using specialized

29

technology. Pitchbook, a company that gathers data on entrepreneurial activity, does this type of data management in-house. Pitchbook gives its subscribers access to aggregate statistics only and doles out extracts of detailed data in small batches. This protects their monopoly on data but in the process keeps much of the information private.

5. Discussion & Conclusion

The most serious business problem facing digital behemoths like Facebook and Google now comes from regulators seeking to rein in their outsize political, social and economic power. Facebook, the focal example of our review essay, exemplifies one of the most significant strategic conundrums now facing digital platforms—how to produce high quality discourse. We harness the ideas of four Nobel prize winners to explain what *quality* is in the context of platforms, and how to achieve it with governance strategy. We then apply these ideas to our Facebook example to illustrate how they can be used to address the strategic conundrums. In the process, we illustrate in what ways the decisions are interdependent and thus can be characterized as strategic (Leiblein, Reuer and Zenger, 2018). In our setting, the first strategic decision is the platform's quality level, which in turn affects governance choices and customer decisions. Our analysis also challenges the notion, common in the technically sophisticated digital platform market, that quality problems are technical problems to be solved by engineers, rather than strategic problems to be solved by managers.

Specifically, we examine governance strategy as the set of decisions that generate quality. Governance strategy encompasses three questions: who has access to the platform, what they may do on the platform, and what information is disclosed or concealed. Together, these choices

determine the quality of the information exchanged on the digital platform. To analyze digital platforms' governance strategy, both IE and TCE are needed.

From IE, the lemons problem is cast as a central problem for a platform. In the classic lemons problem, sellers have more information than buyers about the quality of their used cars, and they have an incentive to misrepresent that quality. The metaphor of a market for used cars is most straightforward in the online market for new and used goods, and much of the literature studies data from auction sites like eBay. By contrast, we use IE to examine a social media platform and show how the lemons problem applies to digital platforms in general, including platforms where information is exchanged rather than goods. It is still the job of the platform to solve the lemons problem so that exchanges can occur.

Next, we use TCE to connect differentiation and governance. A platform strategically chooses a level of quality, whether in markets for information or for new and used goods. Then TCE guides the choice of governance mechanism, which affects the quality of information and discourse that can be exchanged. A TCE analysis begins by examining the transaction, in this case, the exchange of information and discourse, and asks, what could possibly go wrong? The mechanism that achieves the desired level of quality at the lowest cost is then chosen from a menu of governance mechanisms. The menu is generated by considering the full range of make-or-buy modes, including crowdsourcing, outsourcing at arms-length, hybrids such as networks, and vertical integration.

Our combination of IE and TCE follows others who have compared the two theories, including Williamson (2005) and Reuer (2009). Like Reuer (2009), we also propose a number of areas where IE and TCE can be fruitfully combined as complements, as summarized in Table 3.

[Insert Table 3 about here]

31

In our analysis, we assume that firms are able to implement their chosen strategy. In a traditional TCE view of governance, this would mean putting in place effective administrative controls and incentives within a supportive legal system. But with inept governance, even a strategy targeting high-quality could yet yield a lemons problem that cannot be solved. More research could unpack the relationship between governance strategy and governance capabilities. For example, Facebook's proposed changes (March 29, 2019) may be constrained by their own weak governance capabilities. They plan to restrict discourse to private "living rooms" even though this fails to prevent the intrusion by unwanted fake users or manipulation by advertisers and app developers. Their second proposal, encrypting user communications, also fails to address the fact that users' data is in the hands of nefarious actors who can reach users, now using encrypted communications. Finally, Zuckerberg's call for a role for government (March 30) is a way to outsource governance activity to public agencies, which is a low-cost way to produce low-quality outcomes for users.

This view of the role of governance would challenge the notion that platforms must trade-off quality for rapid growth. At Facebook, executives describe a massive cultural shift to focus more on "enforcement as a key component" of its system, whereas previously, "the emphasis was on growth and connecting more users to one another around the world" (Seetharaman, 2018b). And studies do find that open platforms grow faster (Boudreau, 2010). However, there may be a peak (Casadesus-Masanell and Halaburda, 2014), if more openness means less control over the quality of the platform (Boudreau, 2010). Thus, better governance in terms of execution when vetting platform participants matters.

Second, platform governance strategy drives technology strategy, as we explained with our focal example. But more research would examine this relationship: to what extent are

technical issues and strategic decisions bundles of interdependent decisions? Part of the reason for Facebook's overall lack of attention to the lemons problem may have been its view of strategy as "advertising sales, legal and policy issues" (Morris, Seetharaman, and McMillan, 2018). Even now, Facebook expects government regulators to set quality levels. But now that policymakers have raised alarms, Zuckerberg finds his "engineering challenges" defined for him by his earlier platform governance choices. His team "was for years focused primarily on growth and developing new products, rather than safety and security" (Morris, Seetharaman, and McMillan, 2018). Thus, a grow-big-fast strategy represents one bundle of interdependent decisions among which fake news is regarded as a technical issue. By contrast, differentiating with high quality presents a very different bundle of interdependent decisions. For example, Pinterest rejected a grow-big-fast strategy; the company chooses not to pay for new users and instead pursues a higher-quality user base (Griffith, 2018).

The theoretical foundations that we propose for digital platforms' governance strategy have the potential to unpack other phenomena of growing importance and interest. Blockchain, which is used to support cryptocurrencies and other purposes, is a crowd-based mechanism for performing transactions while providing privacy (Halaburda and Haeringer, 2019). In our focal example, we showed that information privacy is characteristically distinct from data security. Facebook violated user privacy not through security lapses but through its own governance rules and implementation failures. While Blockchain offers privacy through anonymity, TCE suggests that blockchain can be used creatively to provide privacy via a number of governance mechanisms. For example, a more vertically integrated version of blockchain might involve restricting who can use the blockchain and what users can do with the blockchain. Restricting use to trusted participants would make "the process of maintaining the blockchain faster and less

energy-hungry," and thus more useful (Economist, 2018). The dual theories of IE and TCE in tandem can clarify how new digital platform technologies can be implemented.

Finally, an interesting feature of our case is the public "bad" aspect of fake news. While fake news negatively affects a community, hence its publicness, it is a private good. That is, users enjoy socially divisive fake news or "click bait". Thus, it may be that regulators must address the negative externality of fake news. Yet, unlike spam, which is a private bad, fake news is a public bad such that the market may not address the production and dissemination of fake news. There may be a number of ways for regulators to frame these questions, whether in terms of outsourcing freedom of speech to policymakers or in terms of eradicating a public health threat. More research is both welcome and urgent.

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Table 1: Economic Theories on Dimensions of Platform Governance

	Who may _access_ the platform	**What _interactions_ users may perform on the platform**	**What _private_ user information is concealed or disclosed**
Information Economics: The lemons problem	Open access to all, or limit access to vetted participants		More disclosure is better. Ratings can reduce information asymmetry
Information Economics: Information privacy		Participants might use information to act opportunistically against other users	Privacy can deter opportunism
Transaction Cost Economics: The mechanisms of governance	The extent of vetting and quality control depends on the level of vertical integration	The extent of control over participants depends on level of vertical integration	The extent of internal controls that keep information concealed depends on level of vertical integration. Credible commitment to not collect data limits disclosure.

Table 2: Options for the Three Dimensions of Platform Governance

Governance decision:	Access	Action	Disclosure
Crowdsource	Facebook users are asked to detect and report other users who use false identities	Facebook users are asked to detect and report the actions of other users who violate terms of service	Facebook users are asked to detect and report disclosure of information that violates terms of service
Outsource	Hire specialized firms (e.g., FireEye) to detect users using false identities or to perform identity verification	Hire specialized firms (e.g., FactCheck.org or Associated Press) to verify news stories	Hire specialized firms (e.g., the US Census Bureau) to manage data operations
"Hybrid" (none of these is ever observed as digital platform's governance strategy)	Organize cooperative effort with other digital platforms to combat false identities	Partner with other firms or government agencies to prevent, detect, or otherwise address fake news	Join a network of firms that verifies data deletion
Vertical integration	Perform identity verification in-house	Create algorithms that detect fake news	Define extracts of data that app developers could use while concealing identities

Table 3: New Research Questions on Digital Platforms' Governance Strategy--IE & TCE

Topic	IE	TCE	New research questions on digital platforms' governance strategy
Organizational governance	Lemons problem resulting from weak organizational governance	Views organizational governance in terms of administrative controls, incentives, and the supporting legal regime	While platforms may make governance decisions, weak implementation may still result in a failure to address the lemons problem
Technology strategy	Technical problems associated with quality are driven by governance strategy		Another way in which of strategic decisions are interdependent: Technical issues and strategic decisions are bundles of interdependent decisions
Blockchain	Privacy vs. anonymity	Blockchain can be implemented using different governance mechanisms	Blockchain can be used creatively to provide privacy, with or without anonymity
Private bads, public bad	Traditionally, things people dislike, e.g., spam, is a private bad and negatively affects quality	But people like socially divisive fake news (click bait), even though it's a public bad	How should regulators address public bads, given that people enjoy click bait? Can a firm outsource the vetting of platform discourse to the Constitution on freedom of speech?