Innovating Antitrust Law: How Innovation Really Happens and How Antitrust Law Should Adapt

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INTRODUCTION

Innovation is the most important driver of economic growth and is central to improving people's lives over the long run. Promoting innovation is, increasingly, a central feature of antitrust law, with antitrust practitioners in recent decades relying on economic analyses of innovation to interpret and enforce the law.

But antitrust practitioners' current paradigms on innovation are incomplete because they draw primarily on neoclassical approaches to economics, which analyze economic behavior as resulting from rational, utility-maximizing agents acting according to their own incentives. As a result, practitioners see innovation as a question primarily of the incentives of market agents. This mode of thinking came from 1970s market fundamentalist economists and commentators such as Robert Bork. But the ultimate dominance of neoclassical paradigms in antitrust occurred because the entire ideological spectrum of the antitrust community internalized neoclassical paradigms as it sought to improve antitrust law by incorporating economic research, which came largely from economics faculties employing a neoclassical methodology.

Incorporating diverse paradigms on innovation from other schools of economic thought into antitrust would lead competition policy to support innovation better, benefitting innovators, consumers, and workers—and leading to stronger, shared economic growth. In particular, competition policy must account for how innovation actually takes place. Research from across fields demonstrates that economic incentives alone don't just pull innovations into existence: Other factors and conditions must be present. A crucial theme in innovation research is that innovation is an emergent phenomenon resulting from mixing different capabilities (such as skillsets, technologies, or product components). Often, innovators have both pecuniary and nonpecuniary motivations, and the public sector plays a crucial role in shaping the rate and direction of innovation. It is time to bring these perspectives on innovation into competition policy.

Section 1 of this report addresses how economic paradigms shape antitrust interpretation. Section 2 contrasts incentive-based and capabilities-based views on innovation. Section 3 demonstrates that antitrust today primarily relies on an incentive-oriented understanding of innovation and ignores a capabilities-oriented understanding of innovation. Section 4 addresses how to integrate a capabilities-oriented understanding of innovation into antitrust. Section 5 covers examples and policy prescriptions.

1. ECONOMIC PARADIGMS FRAME ANTITRUST INTERPRETATION AND ENFORCEMENT, INCLUDING HOW WE THINK ABOUT THE INNOVATION PROCESS

Paradigms are beliefs that people or institutions hold that *structure* and *integrate* analytical solutions to narrow questions to solve complex problems. Paradigms represent assumptions about the way the world works: They shape what we decide to pay attention to when we model certain activities or attempt to explain certain phenomena. In short, paradigms are a form of worldview about a problem. Paradigms *structure* modeling and analysis of specific questions. In economic modeling, we need to form hypotheses about problems to render them analytically tractable. These hypotheses, which we base on our chosen paradigms, influence which features of a problem we consider relevant to a model. A standard paradigm in neoclassical economics is that economic agents are rational profit-maximizers, which leads to a modeling approach of maximizing the financial incentives of economic agents.

We also use paradigms to *integrate* narrow, technical analyses to build a broader understanding of a complex issue, using inductive reasoning. Integrating technical analyses into broader narratives requires us to fill in gaps, simplify, and generalize in a way that renders a complex problem tractable. Paradigms help us do this. For instance, we may develop a narrative around how innovation happens by combining different models or case studies about innovation in specific situations to infer a larger truth about innovation. Paradigms help us decide what aspects of models to pay attention to, and how to build an overall causal narrative.

Paradigms have more impact on an analysis when they *integrate* analyses into a broader narrative than when they *structure* a technical analysis on a narrow question. We can identify good answers to narrow questions, paying attention to case-specific nuances. But integrating technical analyses into broader narratives requires us to fill in gaps, simplify, and generalize, and we use paradigms extensively when doing so.

Of course, some paradigms are more accurate, and some less. Working with paradigms often means acknowledging that they represent only a part of the whole picture. Paradigms can be very hard to see from the inside of a coherent system because a paradigm shapes how we see the world—often, we need to step out of a particular worldview to understand its impact.

Paradigms about the economy affect many aspects of antitrust enforcement, with real implications for how firms compete. In some cases, antitrust enforcers use economic analysis to understand how the case might impact welfare, and paradigms structure these analyses. When creating general rules in antitrust, such as those prohibiting or allowing mergers under certain conditions, judges and policymakers rely on paradigms to integrate an understanding about how the economy works: They must do this to make decisions expediently, rather than exploring economic foundations in each case. For example, in antitrust we often design rules that are most likely to maximize the incentive of an economic agent to innovate, adopting a paradigm that innovation happens when incentivized agents apply effort to a problem.

Antitrust often decides whether to intervene to prevent harm to innovation according to general rules of law rather than case-specific economic analysis, which makes paradigms around innovation especially influential in deciding antitrust cases. Empirically evaluating the impact on economic welfare in all but the simplest cases is almost impossible (Hovenkamp and Scott Morton 2020). This is particularly true in innovation markets or when considering questions of harm to innovation, where evidence on new products is limited and often highly speculative, and it is often wiser to rely on general economic principles (Federico, Scott Morton, and Shapiro 2019).

Enforcers do, of course, pay close attention to case-specific features when applying antitrust rules to particular cases. Many theories of harm are decided under the rule of reason,[1] and enforcers conduct substantial analysis of economic effects in a given case. But even here, exactly what an enforcer must prove often depends more on general rules than specific contextual welfare evaluations. In innovation cases, proving empirically that firms reduced R&D on particular projects (thereby harming consumers) is generally impossible. Assertive antitrust enforcement only requires enforcers to show that firms would have less incentive to develop new products (Federico, Scott Morton, and Shapiro 2019).

2. TWO PARADIGMS ON INNOVATION: INNOVATION-AS-INCENTIVES OR INNOVATION-AS-CAPABILITIES

Innovation has been heavily studied in economics and the social sciences over the last 50 years. Two different approaches to understanding innovation are most relevant here.[2] The first approach, rooted in neoclassical economic traditions, understands innovation as taking place as a result of the efforts of appropriately incentivized market actors. This approach typically analyzes innovation as something that happens within a particular firm, and responds to clear material rewards. On this understanding, innovation policy should aim to maximize the financial incentives of discrete market actors (usually individual firms) to innovate.

The second approach understands innovation as "emerging" from a structure of social and technological relations that are conducive to innovation; for example, more innovation happens in Silicon Valley (where talent, funding, partners, universities, and customers exist in close proximity) than elsewhere. This approach focuses more on the relationships between firms, talent, customers, investors, research institutions, and partners, and understands innovation to come from sharing

[1] Under which antitrust litigators conduct a case-by-case analysis of the economic impacts of a specific practice to decide if it should be prohibited.

[2] Innovation research has arisen from many different perspectives. The vast and diverse literature on innovation is difficult to summarize comprehensively, and this report does not attempt to do so.

knowledge and resources among a variety of actors. It draws broadly on research from different fields in the social sciences and suggests innovation policy should aim to structure social and technological relations in a way that supports innovation.

These approaches to understanding innovation are not mutually exclusive, and both make sense: From a venture capitalist's perspective, innovation happens because profit-motivated entrepreneurs take risks and work hard; from a bird's eye view economic perspective, the right circumstances draw innovation out of certain groups, firms, and places.

As explored below, competition policy primarily views innovation as a question of the incentives of market actors, and has neglected to consider what social and technological relationships might stimulate innovation. To best promote innovation, competition policy needs to combine its incentive-oriented approach with a richer understanding of how social relations can stimulate innovation.

a. Innovation-as-Incentives: Innovation Arises from Individual Market Actors Who Apply Effort to a Problem, Motivated by Appropriate Incentives

Neoclassical approaches to the economic analysis of industrial organization consider innovation to take place due to the efforts of appropriately incentivized market actors. We'll call this the Innovation-as-Incentives paradigm. These analyses try to balance the incentive created by letting innovators profit from their inventions with the pressure to innovate to stay ahead of competitors. Balancing these two sets of incentives will maximize the overall incentive to innovate (Federico, Scott Morton, and Shapiro 2019).

This Innovation-as-Incentives paradigm structures the way that neoclassical industrial organization economists analyze innovation in antitrust cases. For example, Federico, Langus, and Valletti (2017) detail a model in which all firms can eventually achieve a particular product innovation if they apply

sufficient effort. This model helps identify circumstances in which a merger reduces a firm's incentive to innovate. In this case, the paradigm that innovation arises from effort applied by a firm in response to incentives defines how Federico et al.'s model takes shape. The model works within this paradigm to structure an analysis to a narrow question on merger policy and innovation.

Policymakers and academics also use the Innovation-as-Incentives paradigm to integrate research to answer larger questions. Shapiro (2019) demonstrates this as he tries to tie together existing research on innovation into three principles:

- Contestability: Capturing profits from competitors spurs innovation.
- Appropriability: Being able to appropriate profits from an innovation spurs innovation activity.
- Synergy: Mergers of complementary assets can lead to innovation.

"Contestability" and "appropriability" are based on the incentives of innovators to innovate, and they predominate Shapiro's inquiry.

Shapiro's framework has been influential and is widely adopted by agencies and academics.[3] It has, for example, often been used to explain the European General Court's decision prohibiting the merger of Deutsche Börse and NYSE Euronext.[4] These competing stock exchanges pressured each other to innovate, and much of their innovation in trading technology came from their efforts to outdo each other to win business. While allowing them to combine would let the joint entity *appropriate* greater profits from each innovation (because the joint entity would apply innovations to more customers), on balance prohibiting their merger would maximize innovation incentives because the two stock exchanges were motivated to innovate to *contest* each other's business.

[3] See, for example, Competition Directorate-General of the European Commission, Competition Policy Brief: EU Merger Control and Innovation 2 (April 2016) and (Directorate-General for Research and Innovation (European Commission), Ezrachia, and Stuckeb 2020).
[4] See Case T-175/12 *Deutsche Börse v European Commission* (2015).

Exactly how this mode of economic research informs competition and antitrust inquiry is complex, and covered in substantial detail elsewhere (Kokkoris and Valletti 2020; Federico, Scott Morton, and Shapiro 2019). For our purposes, it is enough to appreciate that a certain form of embedded paradigm shapes both the narrow analytical research that economists use to address scientific questions, as well as the broader conclusions that lawyers, economists, and policymakers draw around what promotes innovation in general. This paradigm embeds certain assumptions around how innovation takes place into antitrust that then determine the terrain of permissible policy interventions.

b. Innovation-as-Capabilities: Innovation Is an Emergent Phenomenon that Arises from Combining Capabilities in Conducive Environments

Where the Innovation-as-Incentives paradigm addresses how much effort market actors are likely to put into innovation in different circumstances, other research tries to understand the mechanics of how innovation actually happens. A standard paradigm within this line of research is that innovation takes place by combining pre-existing "ingredients" or capabilities in new ways. We'll call this the Innovation-as-Capabilities paradigm. Under this paradigm, innovations of a certain type are more likely to arise where more of the required capabilities are in close proximity to each other. Proximity here means relational proximity, or the ease with which market participants can combine different capabilities to come up with new products and services. This could include geographic proximity, but will also include the strength of social or professional ties between workers and customers, knowledge sharing between firms, and ease of access to opportunities or commercial partners. Innovations "emerge" from combining capabilities in new ways because the new system becomes more than the sum of its parts, achieving things its component capabilities cannot do alone.

Capabilities under this paradigm consist of the knowledge to do or make something. This knowledge can be recorded and transmitted as codes, manuals, or in books. But most useful knowledge in economic activity is tacit and is embedded in products, individuals, infrastructure, or organizations, particularly at a technological frontier. For example, to use a microwave, we do not have to

understand the physics behind microwaves, or how they are designed, built, or powered. All this knowledge is embedded in the microwave and made available to us to use as a functioning product.

A capability can therefore be transferred by moving a product through trade, moving teams or people with particular know-how, or moving knowledge through discussion or publication of manuals. As useful knowledge for production is often tacit, moving products or people often transfers a capability more effectively than sharing information in written publications. Capabilities are embedded practical knowledge that is difficult to transfer.

Research conducted under the Innovation-as-Capabilities paradigm is much more methodologically diverse than research conducted under the Innovation-as-Incentives paradigm. Research under the Innovation-as-Capabilities paradigm has touched disciplines as diverse as sociology, economic history, economic geography, complexity economics, and business strategy. These communities do not regularly engage with antitrust and competition practitioners and much of this research needs translating to apply it to competition policy.

Brian Arthur's (2009) foundational research elaborates how new technology emerges under the Innovation-as-Capabilities paradigm. He argues that new technologies are almost always a combination of existing technologies, and existing technologies are made up of smaller technologies organized into systems. Technology "evolves" as new components are added and systems are reorganized to improve a particular technology until the technology becomes mature and progress slows. New technologies can also emerge where they satisfy a particular need better than older ones. This paradigm informs a diverse collection of recent research from across the social sciences (see, for example, McNerney et al. 2011; Youn et al. 2015; Pichler, Lafond, and Farmer 2020; Cowan and Jonard 2003).

Innovation-as-Capabilities paradigms have substantially impacted work in economic geography, which examines why economic activity happens in certain places. Hidalgo and Hausmann's economic complexity framework infers a region's capabilities from what it produces and

demonstrates that places with more capabilities are able to produce radically more—and more complex—products. Under this model, economic development takes place when particular areas acquire new capabilities, which they can recombine with their existing capabilities to produce new products and services.

Other research in economic geography validates that movement of knowledge workers is key to innovation. Saxenian (1996) argues that unrestricted movement of workers across firms was a key enabler of Silicon Valley's innovative dynamism. Hyde (2003) and Gilson (1999) argue that Silicon Valley as a whole outperformed Massachusetts so spectacularly in the 1980s and 1990s because California did not enforce employee noncompetes, leading to much more circulation of employees, know-how, and ideas between firms in California than in Massachusetts (Benkler 2017).

The Innovation-as-Capabilities paradigm has also influenced business writing on competitive strategy. Baldwin and Clark's (2000) research at Harvard Business School demonstrates that the computer industry has achieved remarkable levels of growth by embracing modularity and subsystems that can be innovated independently and integrated in new ways. In research conducted with the management consultancy BCG, Fink et al. (2017; 2019) model when companies should focus on acquiring more complex capabilities that would enable them to innovate in more complex ways, and when they should focus on exploiting their current capabilities.

c. Reconciling Innovation-as-Capabilities with Innovation-as-Incentives Frameworks

An Innovation-as-Capabilities paradigm does not necessarily conflict with an Innovation-as-Incentives approach: Innovation requires both incentives to motivate individual effort and required capabilities or ingredients to exist in a way that makes them easy to combine. Occasionally, however, there is tension between the policy prescriptions that incentive-based and capabilities-based approaches would suggest. An incentive-based understanding of innovation demands that the innovation is appropriable, and would therefore tend to privatize returns and allocate them to

particular innovators. In intellectual property law, this approach has led to a strengthening of intellectual property rights (Benkler 2017). By contrast, a capabilities-based understanding of innovation would promote the sharing of capabilities across networks and among both market and non-market participants. In intellectual property law, a capabilities-based understanding would therefore suggest more sharing and weaker intellectual property rights (Benkler 2017). It may be that these two approaches to understanding innovation are challenging to hold together in different antitrust contexts, but this might be because policy has yet to seriously wrestle with an Innovation-as-Capabilities approach.

The government plays a different role under incentive-based and capabilities-based approaches to economic regulation: Under an incentive-based understanding of innovation, policy should aim to maximize the incentives of innovators to "pull" innovation from ordinary market processes. By contrast, a capabilities-based approach calls for a much more active "push" role for the state, in which government aims to supply missing capabilities, coordinate strategic networking and sharing of capabilities, and shape not just the rate but also the direction of innovative activity (Mazzucato 2013). Research accordingly suggests that policies to promote sharing of information on how to innovate are more effective than policies that increase incentives to innovate through the tax system, validating a capabilities-based understanding of innovation (Bell et al. 2019).

Moderna's recent patent dispute with the National Institutes of Health (NIH) demonstrates how this tension can be relevant to economic regulation. Moderna claims that its scientists deserve sole credit as inventors of a patent crucial to manufacturing its COVID-19 vaccine, whereas the NIH claims that this patent arose out of a multiyear collaboration during which the NIH and Moderna pooled their expertise, with many of the riskiest areas of research funded by the government (Robbins and Stolberg 2021). An Innovation-as-Incentives approach may give Moderna the patent—doing so would maximize Moderna's ability to appropriate returns from its investments in innovation and thereby incentivize future innovators. By contrast, an Innovation-as-Capabilities approach would recognize the deep collaboration involved in producing the COVID-19 vaccine, and support policies that

encourage this sort of sharing of information and collaboration, for which our current patent system may not be well-designed (Benkler 2017).

Both Innovation-as-Incentives and Innovation-as-Capabilities approaches are required to understand Moderna's creation of an mRNA COVID-19 vaccine. Government-directed industrial policy, sharing of information within networks, and public-private collaboration was just as important in the creation of the vaccine as private investment in response to incentives. Patent law must balance these approaches as it seeks to create economic regulation that supports innovation, and the same is true of antitrust and competition policy.

3. US ANTITRUST LAW PRIMARILY ADOPTS INNOVATION-AS-INCENTIVES PARADIGMS AND IGNORES INNOVATION-AS-CAPABILITIES PARADIGMS

US Antitrust practitioners to date have largely adopted the Innovation-as-Incentives paradigm (Shapiro 2019). The Innovation-as-Capabilities paradigm is missing almost entirely from US antitrust law—which suffers as a result.

We see this in US cases on the essential facilities doctrine, which obliges dominant companies to share essential infrastructure, facilities, or resources with smaller competitors. Where cornerstone essential facilities cases consider innovation, they adopt an Innovation-as-Incentives framing, which has shaped the parameters of legitimate debate around innovation and affected the development of the law. Analysis follows a similar pattern in other areas of antitrust, though it is beyond the scope of this report to address how innovation concerns arise in all areas of antitrust law.

An Innovation-as-Incentives approach was responsible for dramatically restricting the essential facilities doctrine in *Verizon v. Trinko* (2004), such that many practitioners consider it substantially impossible to bring a successful essential facilities claim against a dominant company (Guggenberger 2020). *Verizon v. Trinko* held that Verizon, in insufficiently sharing its

telecommunications infrastructure with rivals, did not violate antitrust doctrine on essential facilities. This decision was reached based on an incentive-oriented understanding of innovation: Not requiring companies to share innovations with their rivals would promote investment in innovation. Speaking for a majority on a unanimous Supreme Court, Justice Scalia stated:[5]

> The opportunity to charge monopoly prices—at least for a short period—is what attracts "business acumen" in the first place; it induces risk taking that produces innovation and economic growth. To safeguard the incentive to innovate, the possession of monopoly power will not be found unlawful unless it is accompanied by an element of anticompetitive conduct.

Note that this application of the Innovation-as-Incentives paradigm did not mandate the particular result in *Trinko*. Innovation incentives can arise both from appropriating profits and from a need to stay ahead of close competitors (Federico, Scott Morton, and Shapiro 2019).[6] In *Trinko*, the Court could have obliged Verizon to share its network under the Innovation-as-Incentives paradigm if it thought that doing so would ensure that Verizon was subject to more acute competitive pressure.

But the Innovation-as-Incentives paradigm does structure how antitrust law frames the issue. This "framing" is not neutral: In *Trinko*, it led the Court to focus on a conception of innovation as a result of individual effort applied in response to incentives. Focusing on the individual firms in this way meant the Court did not engage with questions around what social relations would best facilitate innovation. The paradigm of Innovation-as-Incentives gave the Court a prism through which to view the case (adopted directly from neoclassical reasoning), which led the Court to focus on certain features at the expense of others. Legal commentary on the essential facilities doctrine and duties to

[5] *Verizon Communications Inc. v. Law Offices of Curtis V. Trinko, LLP*, 540 US 398 (2004).

[6] Antitrust practitioners often refer to this tension as the Schumpeter/Arrow debate: Schumpeter argued that innovation incentives are often maximized when companies are allowed to exploit their innovations. Arrow, by contrast, argued that innovation incentives are often maximized where companies need to innovate to get ahead of close competitors.

deal has subsequently been dominated by the Innovation-as-Incentives paradigm, with similar results.[7]

The Federal Trade Commission's (FTC's) recent challenge to Facebook demonstrates just how much this incentive-oriented reasoning has scarred antitrust law. In its initial complaint, the FTC challenged Facebook's efforts to throttle access to its Application Programming Interfaces (APIs)—which determine how software applications can interoperate—and therefore degrade its competitors' ability to interoperate with its services. In dismissing the FTC's complaint, Judge Boasberg of the US District Court concluded that Facebook's refusal to interoperate with competitors could not violate US antitrust law. Consistent with previous decisions, Judge Boasberg relied on the Innovation-as-Incentives paradigm, stating:[8]

> [f]irms may acquire monopoly power by establishing an infrastructure that renders them uniquely suited to serve their customers. Compelling such firms to share the source of their advantage is in some tension with the underlying purpose of antitrust law, since it may lessen the incentive for the monopolist, the rival, or both to invest in those economically beneficial facilities.

Based on a misunderstanding of how innovation works, Judge Boasberg insulated Facebook's most innovation-harming activities from antitrust challenge. He recused antitrust from taking a central role controlling key strategic interfaces for the recombination of technologies and components in the digital economy (APIs). Innovation-as-Capabilities research demands exactly the opposite: that antitrust meticulously safeguard the ability of new technologies to interoperate along key platform interfaces and stand firm against companies' attempts to bend these interfaces to their advantage. Antitrust law's failure to do so harms innovation and leaves us all worse off.

[7] See Hovenkamp and Bohannan 2012, Chapter 11.

[8] Memorandum Opinion in *FTC v. Facebook* Case 1:20-cv-03590-JEB (D.D.C June 28, 2021) at page 35, quoting *Trinko*, 540 US at 407—08.

So what would an alternative judgement look like? As a thought experiment, we might consider how future Supreme Court Justices would frame their reasoning in *Verizon v. Trinko* in an alternate world where the Innovation-as-Capabilities paradigm is dominant, and the Innovation-as-Incentives paradigm was less gripping. Considering the facts of *Verizon v. Trinko*, a future Justice might reason:

> "The opportunity to innovate within a specific techno-economic domain requires that astute business people have access to that domain's essential capabilities, and that they can recombine these capabilities freely to create new products and services. Where unique capabilities are controlled by companies or their access is otherwise restricted, making these capabilities available for exchange as market commodities empowers entrepreneurs to experiment, which produces innovation and economic growth. To safeguard the ability to innovate, restricting access to a capability will be considered unlawful if that capability is not reasonably available elsewhere and that capability is required as an ingredient in new products and services."

Again, this reasoning does not predetermine whether Verizon must share its network with competitors, but it frames the impact of the case on innovation in a wholly different way (one that is well supported by economic research). To oblige Verizon to share its network, litigators must still demonstrate on the facts of the case that the network was an essential ingredient for innovation, and that equivalent capabilities were not available elsewhere (alongside other tests a court may choose to impose, such as those related to innovation incentives, proportionality, or materiality). Of course, properly integrating the Innovation-as-Capabilities paradigm into competition policy will require much more work than this thought experiment, but this example suggests one way to do so in the context of the essential facilities doctrine.

4. IMPLICATIONS OF INNOVATION-AS-CAPABILITIES PARADIGMS FOR ANTITRUST LAW AND POLICY

A competition policy based on Innovation-as-Capabilities paradigms would aim to maximize the available capabilities that innovators and economic actors can use to develop new ideas and launch new products. This sort of competition policy would aim to "modularize" markets where possible, by

ensuring that different component capabilities that make up broader technological systems are available to be sold, licensed, or provided for integration into other technologies. Protecting modularization is particularly important where new technologies or capabilities emerge that could lead to greater competition and innovation in a variety of related markets. In situations in which companies hoard or vigorously protect unique capabilities that could unlock broader innovation, competition policy would aim to make these capabilities tradable as market commodities when practicable—offering the company that owns the capability a fair rate of return to maintain innovation incentives.

Competition policy would also need to strictly control key interfaces between modules or around a network, technology, or platform, which would likely involve strong interoperability remedies. These interfaces dictate how capabilities can be recombined. Aside from technology interfaces, modularized innovation has many degrees of freedom and would not warrant heavy-handed intervention or scrutiny. These considerations are relevant to platforms as well as vertical and conglomerate theories of harm in antitrust.

An Innovation-as-Capabilities perspective suggests that competition policy should be concerned with ensuring workers can move easily between firms and knowledge can flow freely across networks. Since novel capabilities are often trapped in workers' tacit knowledge, movement of workers between firms is a key driver of innovation.

More generally, Innovation-as-Capabilities paradigms cast the role of government in competition policy in a different light. A commonly understood implication of the Innovation-as-Incentives paradigm is that government should conduct basic research as a public good (the results of which are rarely appropriable), but generally leave applied research to private sector actors motivated by their own incentives.

By contrast, the Innovation-as-Capabilities paradigm suggests that government has a key role in coordinating innovation communities, facilitating place-based clusters or ecosystems, and shaping

the pace and direction of innovation. Many foundational technological breakthroughs have occurred through a blending of capabilities only achievable through government direction (Mazzucato 2013), most recently (and visibly) the development of mRNA COVID-19 vaccines. Placing emphasis on Innovation-as-Capabilities paradigms in antitrust demands that competition policy accepts an active role for government industrial policy, by curating innovation communities, sharing information, and modularizing technologies to open up access to key capabilities.

Integrating this understanding of government presents challenges for a competition policy achieved largely through judge-made antitrust law. Appreciating that government has an active, contextual role in facilitating collaboration, directing innovation and modularizing technologies puts competition policy in a domain that is increasingly administrative and less achievable through court litigation. A challenge for competition policy is how to filter these ideas on innovation into antitrust *law* that courts can apply, as opposed to policy criteria that properly belong to administrative government.

Capabilities paradigms would also bring social inequality on racial and gender lines more directly into antitrust analysis. Capabilities paradigms suggest that who can innovate depends on who has access to key capabilities that they can recombine. Access to these capabilities is distributed unequally in society, disadvantaging minorities and women (Bell et al. 2019). Antitrust theories of harm based on Innovation-as-Capabilities paradigms may consider whether disadvantaged groups lose access to key capabilities that hinder their ability to innovate.

Capabilities-based policy solutions are not entirely new to antitrust: The essential facilities doctrine in the EU seems more congruent with a capabilities-oriented approach. Antitrust also has special provisions around research and development joint ventures that enable companies to share information and collaborate on innovation projects without violating antitrust rules.[9] And yet, where

[9] See the Research and Development Block Exemption under EU Competition law: Commission Regulation (EU) No 1217/2010 of 14 December 2010 on the application of Article 101(3) of the Treaty on the Functioning of the European Union to certain categories of research and development agreements.

these solutions appear, they feel more like an afterthought, often justified without reference to economic research around Innovation-as-Capabilities, and as a side show to antitrust's dominant incentive-oriented economic reasoning.

To some degree, antitrust fails to integrate capabilities-based reasoning because of the skillsets of competition economists. Competition policy's increasing reliance on economic reasoning is valuable, but there is a certain methodological homogeneity in competition policy communities. Opening up competition policy to a greater diversity of economic thought would improve economic reasoning in competition policy.

More importantly, competition policy lacks a simple model based on Innovation-as-Capabilities paradigms that judges and lawyers can apply in legal reasoning. Innovation-as-Incentives paradigms provide a simple, tractable model for how innovation works. Its implications are easy to understand, and they frame the questions we ask, concerns we raise, and answers we give. Innovation-as-Incentives reasoning also coheres with broader neoclassical ideas within antitrust, making for a more cohesive (if simplified) explanatory framework. Competition policy must adopt similarly simple and tractable heuristics based on the Innovation-as-Capabilities paradigm.

Antitrust should adopt the Innovation-as-Capabilities paradigm with vigor, integrating it alongside the current incentive-oriented approach. Antitrust's exclusive reliance on the Innovation-as-Incentives paradigm may lead it to endorse the activities of economic agents who are blocking the progress of innovation in ways that may not be recognized. The specifics of adopting the Innovation-as-Capabilities paradigm will involve careful contextual determinations. In general, antitrust must acknowledge an active role for government in shaping technological development and should see itself as a part of this project. Doing so would involve adopting heuristics around modularizing capabilities, strictly controlling platform interfaces or nodes that connect different subsystems, and promoting free flows of information and movement of workers.

5. POLICY IMPLICATIONS AND CASE EXAMPLES

An Innovation-as-Capabilities approach would suggest that antitrust take an assertive stance on particular questions, such as those related to vertical and conglomerate mergers, essential facilities, and employee noncompetes. This section explores these policy prescriptions (although full analysis of the impact of the Innovation-as-Capabilities paradigm on antitrust law lies beyond the scope of this report).

a. Prevent Vertical and Conglomerate Mergers that Restrict Access to Important Capabilities

Merger policy has the potential to keep important capabilities independent and make them available to many innovators, not just aggressive and well-funded acquirers. According to established thinking in US antitrust law, vertical and conglomerate mergers should only matter when they have the potential to affect horizontal competition within a market. To be sure, an innovation market may be different from a firm's ordinary market for antitrust purposes, as it encompasses all areas of activity the firm may wish to move into.[10] But the main focus is on horizontal parameters of competition that shape incentives to reduce prices, improve quality, and innovate.

An Innovation-as-Capabilities worldview would take vertical and conglomerate mergers much more seriously. It would aim to preserve different capabilities as separate elements, ensuring that unique technologies and services can exist on an independent footing, available to be integrated into multiple different processes, platforms, and systems at once. It would have a much stronger preference to license capabilities to different market actors on a non-exclusive basis than to integrate of a set of capabilities into a single firm through a merger, despite any synergies or efficiencies: Nonexclusive licensing allows capabilities to be repackaged into many different systems.

[10] See the concept of innovation spaces in Kokkoris and Valletti 2020.

In any given case, courts would need to make tricky determinations of fact about whether a merger would remove a unique set of capabilities from the market. Framing merger analysis in this way would represent a different approach in vertical and conglomerate merger cases. Economic research based on Innovation-as-Capabilities paradigms suggests that courts should be asking these questions, at the very least.

This approach would strengthen theories of harm in vertical and conglomerate mergers involving technology platforms. Google's recent acquisition of Fitbit demonstrates this dynamic: The Google-Fitbit merger deeply concerned many observers in the antitrust community as it involved Google folding another large company into its dominant platform ecosystem. But Google and Fitbit were not horizontal competitors and so their merger was unobjectionable under traditional theory. In an enforcement action in Europe, the European Commission's investigation raised concerns that acquiring Fitbit's data would entrench Google's monopoly in digital advertising. It cleared the transaction, accepting three principal remedies focused on acquisition and use of consumer data:

1) That Google would not use Fitbit's data in its online advertising;
2) That Google would allow competitors access to Fitbit's data through its (currently nascent) Application Programming Interfaces; and
3) That Google would continue to allow competitor health tracking products nondiscriminatory access to its Android software.

An Innovation-as-Capabilities perspective would approach the case differently. The primary concern would not be how the merger might affect horizontal competition in the market for digital advertising, but whether the merger would stymie the emergence of a capability "module" that comprises Fitbit and its functionality, one that could be integrated with other systems or components. This perspective would examine whether (outside Google) Fitbit would be much more likely to modularize its key features and license them to others on a nonexclusive basis to promote innovation in adjacent or related products or services. The European Commission's remedies, one of which was around preserving Fitbit's current open access Application Programming Interfaces, touch

on this area of concern. But an Innovation-as-Capabilities approach would likely mandate a stricter remedy, as its concern is not Google's data monopoly in advertising markets but whether Fitbit would develop its Application Programming Interfaces into an independent modularized capability. A similar approach is applicable to ongoing merger reviews by antitrust authorities in technology platform cases, such as Illumina-Grail and Microsoft-Activision.

A legal test for vertical or conglomerate mergers based on this reasoning might suggest that they are permissible where they do not remove or hinder an important capability or set of capabilities from integration into new products, services, or applications on a nonexclusive basis (and do not otherwise fall foul of conventional approaches to merger analysis).

b. Strengthen Antitrust Doctrine around Essential Facilities, Margin Squeezing, and Vertical Theories of Harm in Unilateral Cases

An Innovation-as-Capabilities approach would support a much more assertive essential facilities doctrine in antitrust law around unilateral conduct. It would aim to make particular key capabilities of dominant unilateral companies available in adjacent markets to innovators and competitors. In digital markets, the Innovation-as-Capabilities paradigm would advocate for strong interoperability rules across platforms and between services.

A legal test for such a doctrine might look similar to what European competition law has developed in *IMS Health* and *Microsoft*, where a company must license access to an essential facility where it is needed to develop a new product or service or make technological progress on a secondary market. Courts and commentators should acknowledge that these tests represent a product of valid economic principles, even though they may at times be in tension with dominant neoclassical approaches to economics.

The burgeoning electric vehicle industry demonstrates how this approach might apply: Currently, electric vehicle charging in the US is highly fragmented, comprised of many different proprietary networks, apps, and subscription plans. This hinders efficient adoption of electric vehicles, as interoperable EV charging is a required capability for the adoption of electric vehicles (Hawkins 2021). An Innovation-as-Incentives approach may incline antitrust practitioners to support the current market dynamic, as electric charging network providers must be able to appropriate returns on their investments to maintain investment incentives. By contrast, an Innovation-as-Capabilities approach might decide that this dynamic triggers antitrust intervention under an assertive essential facilities doctrine, imposing interoperability and access requirements where administrable as a matter of law. Of course, careful inquiry into the facts of this situation (which is beyond our scope) would have to precede any remedy, but an assertive capabilities-based regime might consider this situation worthy of investigation.

Deft legal analysis could reconcile a strong essential facilities doctrines based on this approach with the general principle that a company does not have a duty to deal with its competitors.[11] It could, for example, mandate that a company only be required to give access to its technology or facilities when access would be required to promote technological development in an adjacent market, which would broadly mirror the essential facilities doctrine in European competition law. There are significant administrability concerns for judicial mandates around interoperability and access to essential facilities; these concerns could be addressed through a regulatory rather than a judicial approach to competition policy.

c. Prohibit Employee Noncompetes

An Innovation-as-Capabilities approach suggests that competition policy would ban employee noncompetes. Movement of employees between companies is a key enabler of innovation, even though it may reduce appropriability of a company's innovations and may therefore reduce

[11] See *United States v. Colgate & Co.*, 250 US 300 (1919).

investment incentives. President Biden's Executive Order on Competition suggests that this is (rightly) a key administration priority: Section 5(g) of the order directs the Chair of the FTC to consider rulemaking around unfair restrictions of employee mobility. Innovation-as-Capabilities research suggests that these noncompete clauses are a central concern of competition policy rather than merely an "unfair" restriction on workers to be addressed with the FTC's administrative rulemaking authority on unfair methods of competition.

This approach may also bring competition policy in greater conflict with trade secret doctrines and intellectual property law. Other commentators have thoroughly examined the delicate relationship between competition law and intellectual property. For our purposes, it is sufficient to observe that the Innovation-as-Capabilities approach might modestly renegotiate this relationship to facilitate greater movement of ideas and less protection of trade secrets. Economic policy would thereby favor market actors appropriating profits from innovation through good execution to a relatively greater extent than by legally protecting innovations using intellectual property law.

6. CONCLUSION

To better support innovation, competition policy should embrace new economic voices. In particular, it should draw on research based on Innovation-as-Capabilities paradigms to augment existing incentive-oriented analyses familiar to neoclassical economic reasoning.

Translating economic research around Innovation-as-Capabilities into a tractable framework that lawyers can use represents a serious challenge. This report proposes that such a framework would prioritize modularization of technologies, control key interfaces for integration strictly, promote movement of employees between firms, and preserve emerging new technologies or capabilities as independent entities available for open-access licensing or use in multiple different contexts. This suggests three specific policy prescriptions:

1. Scrutinize vertical and conglomerate mergers closely, questioning whether they remove a set of capabilities from open market access;
2. Mandate a strong essential facilities doctrine, which modularizes key capabilities of dominant firms to make them accessible to the market, and controls key technological interfaces to make technologies interoperable. Competition policy must balance this approach with the need to ensure that remedies remain administrable and do not unduly harm innovation incentives; and
3. Refuse to enforce employee noncompetes to promote a free flow between firms of the tacit knowledge and capabilities that are essential to innovation.

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