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The Möbius Organizational Form: Make, Buy, Cooperate, or Co-opt?

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Abstract

This paper examines the emerging contours of a new organizational form, in which firms move beyond the cooperative pacts of alliances to a radicalized, aggressive co-optation of external assets. Taking our point of departure from the literature on the "networked" firm, we point to an alternative to the make, buy, or cooperate decision: in the Möbius form, firms co-opt resources, unsecured by any alliances, formal or informal. Some companies are brazen in their co-optation, leveraging external assets so thoroughly that they might well be considered a core part of the firm. Enabled by developments in computing technologies, such co-optation challenges traditional models of organizational identity. These fluid boundaries recall the Möbius topological model, which we take as the metaphor for this nascent organizational form. We chart this new behavior by discussing a range of firm activities, including the functions of marketing, research and development, and managerial decision-making, as they are replaced with assets co-opted from other firms in the private sector, government agencies, and lastly the firm's own users.

Keywords: organizational form; co-optation; firm boundaries; organizational innovation; economic sociology; crowd work; digital labor; platform; cultural and digital economy.

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Introduction

The explosive volatility of technological progress has given rise to new organizational forms. As the post-industrial economy has shifted from trading in physical goods to information, firms have swapped heavy industrial assets and local human capital for third-party-enabled cloud computing and dispersed labor. It follows that the organizational form of the firm itself would reflexively embody this distributed arrangement, and many firms have experimented with networked organization. Some firms have even gone beyond cooperation, co-opting outside resources to replace what were once core internal capacities.

The form we analyze pushes past earlier iterations of the Möbius arrangement.[1] We observe a radicalization so far-reaching that it lies beyond the continuum of firm strategies between hierarchies and markets (Podolny & Page, 1998; Powell, 2003; Williamson, 1991). Not just another networked organization, Möbius firms defy the language of cooperation that usually defines networked partnerships. To the classic "make, buy, or cooperate" decision (Kogut, Shan, & Walker, 1992) we add a new breed of firm behavior: co-optation. Möbius firms don't make, buy, or ally. They co-opt. As we will see, this is also not outsourcing. Instead of pushing capacities out, they pull them in. Searching for assets upon which to erect their operations, firms locate and integrate value from other firms, publicly funded resources, and their own user communities. We refer to this arrangement as the Möbius firm.

From the Networked Firm to the Möbius Form

Firm activities about and across boundaries have long been a point of interest in the research on organizations. Powell (2003) and Sabel (1991) for example described arrangements in which different companies actively cooperated. In such arrangements, firms agreed to share the burden of risk as well as any fruitful innovations along the production chain. These agreements forged the shape of networks, with the network itself emerging as the result of generative rules of cooperation and coordination (Kogut, 2000). Networked relationships have also been seen as an outcome of assessing potential partners for their value and status (Podolny, 2001).

One key contribution of networked-firm analysis is the argument that such formal cooperation across boundaries anchors the identity of firms, and that their position in the network emerges from collective, dynamic evaluations of partners. Organizational boundaries are often used by scholars as anchor-points, giving shape not only to firms being described but also lending a foundation to different schools of theory. Weber's rational-legal systems assume a segregation of rational activity away from the less-rational exterior social context. Scott and Davis relied on the boundary as a critical criteria for the existence of a bounded collectivity of social actors: "all collectivities — including informal groups, communities, organizations, and entire societies — possess, by definition, boundaries that distinguish them from other systems" (2015, p. 152). In their overview of organization theory, Scott and Davis listed an array of challenges to defining boundaries, both empirical and theoretical. Some definitions are cognitive, based on the perceptions of related actors (Laumann, Marsden, & Prensky, 1983), or their shared interests (Laumann & Knoke, 1987). Networks analysts rely on measuring relations between actors, such as frequency of interaction (Homans, 1950), relational contracts (Gibbons, 2001), embeddedness in historical or relational contexts (Granovetter, 1985), and structural position in a network of firms (Kogut, Shan & Walker, 1992), have also all been posited as determinants of organizational boundaries. Still other work has examined the influence on boundaries of political bargaining (Stark, 1991; 2001) and social capital (Walker, Kogut, & Shan, 2000).

Still other theories are behavioral: Pfeffer and Salancik (1978, p. 30) proposed that individuals' activities (rather than their membership) constitute the contours of an organization, and Barnard (1938) proposed that organizational boundaries lie along the line of cooperative activities. The Möbius strategy presents a challenge across these definitions, as its action patterns bleed across these rational, cognitive, and behavioral definitions, while defying transaction-based theory of the firm (Coase, 1937).

In this paper we describe a set of cases in which firms defy all of these mechanisms and definitions, requiring new theory. The new organizational form that we study poses interesting challenges to orga-

1. Charles Sabel wrote about companies fostering partnerships to brave together the steep start-up costs and turbulent technological changes of the 1980s manufacturing sector (Sabel, 1991).

nizational theory because it raises fundamental questions about what an organization is. In taking on distributed, interwoven arrangements, these firms strain the methods and vocabularies available to organizational scholars. Traditional ways of talking about organizations, institutions, and networks have become less useful as their taxonomic definitions have blurred. New modes of organizing people, devices, and information demand robust new analytical tools, and students of organization remain uniquely equipped to build them.

Our interest is in a similar process happening at the macro level, when organizations co-opt the assets of entire neighboring firms without relational contracts, bending not just organizational boundaries but, how, as scholars, *we* use boundaries as a meaning-making device, to "identify" which firm is which. Co-opted assets bring with them the logics of their construction, being products of their native organizational action-patterns (Schreyögg & Sydow, 2010). It becomes problematic to perceive organizations as discrete units of decision-making (March & Simon, 1958; Ahrne et al., 2016), in the context of the co-optation of such neighboring asset-based logics.

Our research also introduces flexible terminology demanded by the emerging "platform economy." Firms in this space are characterized by activities breaking the traditional theoretical dichotomy between market-based and social coordination (Gillespie, 2010; Grabher, 2017). How does such blurring impact how we as scholars theorize structures? How do we delineate and conceptualize the boundaries of those firms whose operations are built on top of, and threaded through, the platform economy, contingent as they are on third-party assets? Traditional, simple ideas of boundaries between networked firms, whether inert or fluid, do not capture the action patterns we see happening in Möbius firms.

Our presentation will analyze three distinct landscapes in which we find the emergence of the Möbius form. 1) We begin by tracing how Möbius organizations co-opt *assets of other firms*, without contract, cooperation, or generative rules of coordination. 2) Second, we map the capitalization, by private industry, of *assets produced by state actors*. 3) Third, we examine a pattern of increasing prevalence, in which firms integrate into their core operations the managerial *decision-making of their own users*.

For each of these strategic landscapes, we will examine two cases (for a total of six exemplars). For the first strategy, our primary case involves the coupling of a comparison shopping app with mobile-phone cameras that facilitated the penetration of an internet shopping company (Amazon) into a retail giant's storefronts (Best Buy). For the second landscape, our primary case is The Weather Channel, chosen to illustrate the application of a uniform API to federal weather databases that fed the growth of an entire industry. The primary case in our third strategy examines the creation of a news-sharing platform (Reddit) that gives a handful of users the tools to choke off the cash flow of a large corporate entity. These developments, recasting more and more actors and objects as nodes in networked communications, have brought about the need for new theoretical language with which to describe an emergent strategy.

We build our theory of the Möbius organization using multiple contemporary case studies (Eisenhardt & Graebner, 2007) drawn from accounts in diverse contexts for several reasons. Conducting an embedded study within a single organization would be a mismatch to the boundary-challenging nature of the activities we catalogue. Moreover, an intra-organizational study would strip us of the opportunity to survey how the Möbius strategy is emergent across several different sectors, co-opting assets both public and private. Lastly, because the Möbius form challenges existing language on organizations, crossing strategies across several types of firm activity, available theory is ill-equipped to usefully inform the design of an embedded study. Our goal in this phenomenon-driven work is to extend existing theory, by sampling accounts of multiple empirical cases drawn from diverse settings. Our goals are broad in scope, addressing not an isolated case, to capture the breadth and reach of a new operational model.

We call this emerging arrangement the Möbius firm, after a theoretical object called the Möbius Strip. The Möbius Strip was designed to demonstrate mathematical ideas about curvature, rotation, and surface area. Resembling a band of paper curving on itself, any point on the band is "non-orientable," meaning it resists being defined as resting on either the inside or outside of the loop. Handily, this serves well as a metaphor for organizations co-opting assets until they cannot be described as either internal or external to the firm.

First in our catalogue of this new paradigm is how Möbius firms co-opt the assets of *other* organizations.

I. The Organization and Other Firms

New communications technologies allow companies to permeate each others' boundaries in novel ways, realigning chains of production and distribution from which firms have traditionally drawn value. One company that used digital communications to leverage another's assets, without partnerships, contracts, or even the initial awareness of the co-opted party, was Amazon.

Amazon, founded in 1995, is an e-commerce retail company specializing in consumer products. Founder Jeff Bezos, originally a Wall Street trader, started the company with a list of 20 potential products on which to build the Amazon brand. On his list were CDs, computer hardware, and books, which he described as "non-threatening" products with a low price-point. The very first book sold on Amazon in 1995 was, in a bit of beautiful historic synergy, Douglas Hofstader's *Fluid Concepts And Creative Analogies: Computer Models Of The Fundamental Mechanisms Of Thought*. As Amazon grew the company expanded into other goods, including the growing market for digital consumer electronics.

The Goliath in consumer electronics at that time was Best Buy. A brick-and-mortar retail company commanding a material theater of consumption, Best Buy occupied a substantial physical footprint with thousands of stores and hundreds of thousands of employees worldwide. They catered to the mounting global demand for mobile phones, digital music players, tablet computers, and other handheld devices. Unlike books or CDs, these products were considered to be "experiential" goods (Brakus, Schmitt, & Zhang, 2014) featuring sensory and affective attributes; shoppers liked to see and touch before buying so they visited physical shops to try them out and bought them in-store. In 2008, Amazon introduced a mobile phone application linked to the phone's camera. Users were encouraged to take pictures of products inside brick-and-mortar stores, which the app would search for in Amazon's stock. Amazon's offerings were typically at a lower price-point, because Amazon did not have to sustain the overhead of a physical presence. This insertion of their own digital purchasing pathway into brick-and-mortar stores decoupled the actions of "trying out" consumer electronics and making a purchase. Shoppers could check out these new digital products in Best Buy and then buy them from Amazon, all while standing inside Best Buy. This signaled a deliberate effort on Amazon's part to capitalize on brick-and-mortar shops as "showrooms" (Teixeira & Watkins, 2014). No longer did shoppers have to wait until they got home to their computers to compare prices, and no longer did they have to take a risk on buying a completely unseen product online. The app facilitated the rise of showrooming, in which Amazon deliberately leveraged Best Buy stores to educate consumers in both handheld digital products and online purchasing.

Best Buy did not benefit from Amazon's app. In 2011 its managers announced plans to cut back on the company's real estate holdings and posted a fourth-quarter loss of $1.7 billion in 2012. Amazon stood to suffer little from the ill health of the asset from which they drew value, as by this time the public has been thoroughly educated in online shopping. Best Buy abetted the shopping public's embrace of e-commerce, assisting Amazon's growth to become the largest retailer on the planet with a August 2017 market cap of $474 billion. We see here a firm that did not attempt to forge a partnership with another, but rather, co-opted their institutional logic and associated objects, actors, and sites.

Piggybacking onto others firms' investments as a way to achieve rapid scaling is becoming more common. WhatsApp, founded in 2009, is a digital messaging app built on top of the pre-existing contact lists in users' mobile phones. After a user downloads the WhatsApp app from a platform like Google Play or the Apple Store, WhatsApp automatically imports the users' contacts from their phone's native contact-management program. The user doesn't have to input any information into WhatsApp directly. Because WhatsApp uses these phone numbers instead of proprietary user names or profiles (like Facebook and Twitter), users' social contacts are instantly accessible through WhatsApp. This eliminates switching costs normally associated with new networked applications, because a user would ordinarily have to "re-connect" to existing friends and colleagues over and over again for every new messaging platform they joined. WhatsApp bypasses this step, achieving rapid scale by piggybacking onto the infrastructure of contact-collection furnished by the phone manufacturer. This strategy is similar to that of DropBox, another company leveraging existing social networks to achieve rapid scale.[2] Further, WhatsApp *extracts*, or *withdraws*, no value

2. DropBox, a cloud-based data storage company, is another private enterprise built atop of existing social networks. When DropBox was launched, they used referral incentives of free extra storage and a "freemium" pricing model (the most basic version of the product was free, with fees only for higher tiers of service and features), to encourage users to share it with

from the leveraged resource, but rather simply copies the value of existing contact-management structures into their own digital ecosystem. The relationship between the two is relatively sustainable — unlike Amazon's extraction of purchasing behavior from Best Buy sites.

Amazon and WhatsApp have woven their firms around assets of other companies, to substitute for what were once internal practices. Going beyond the simple use of digital infrastructures and accessing their content, these and other companies co-opt other firms' investments and products, sidestepping exorbitant costs of marketing development, network building, and app development without cooperative arrangements.

The challenges to traditional organizational literature presented by Möbius organizations will only become more pressing with the advent of platform services. While still a nascent topic, efforts have been made to build a literature of platforms: how are these systems defined? On what kinds of relationships and networks are they contingent? How are they governed? How do their participants and partners organize? What is the impact of related organizational arrangements, such as open-source and crowd-based communities? (Eisenmann, 2007; Gawer, 2009). "Platforms", while recognized as a slippery term in use across multiple territories, can be roughly thought of as "a computational infrastructure, [or] at least a technical base upon which other programs will run" (Gillespie, 2010). A central challenge to organization studies, still in need of analysis, is how these third-party platform services interact with the institutional logics of the firms built atop them. Take, for example, app developers building products for the Apple Store (a platform that operates like a private market, governed by Apple, for the sale of third-party software to users of Apple hardware). These third-party developers are not employees of Apple, yet they must interpret and apply Apple's policies, such as that of privacy, within their own companies, in order to keep selling their products on the Apple platform. Their internal organizational beliefs and values are, then, threaded with those of Apple, via platform governance (Greene & Shilton, 2017).

The rise of cloud computing and automation services built with proprietary algorithms, inside firms such as Google and IBM Watson, pose challenges to organizational sociology's definitions of core capacities, and how scholars define organizational identity. In another type of platform-based activity, the spread of private platforms functioning as public markets, such as Apple's App Store, also complicate the sociology of markets and valuation. Similarly, another novel Möbius strategy troubling traditional relations between public and private domains is the co-optation of state assets by private industry, explored in the next section.

II. The Organization and the State

A fraught narrative defines the interplay between private enterprise and public organizations. Stakeholders include taxpayers, lobbyists, corporations, the legislature, non-government entities — almost innumerable players. What the State provides in terms of infrastructure, subsidies, beneficial regulations, and general support, and what it asks in terms of tax revenue and other forms of federal cooperation, is a subject of continuous debate. The political inclinations of elected officials, and the cultural imaginary surrounding the role of governmental agencies in the free market, contribute to a fractious landscape. Exacerbating these discussions is the demanding nature of today's information economy. The unremitting need for innovation, and its steep requisite investments in research and development, contributes to an organizational ecology rife with risk. This is such a risky endeavor that the state is often the only entity equipped with the needed resources. State expenditures are critical to advancing many industries. Federal spending on research during WWII and the Cold War, for example, still bears fruit, contributing to what we know today as Silicon Valley (O'Mara, 2005). Firms engaging in such co-optation of state assets are ripe for inclusion in our second type of Möbius organizations.

The Weather Channel, our first example of this type, is broadcast to nearly 100 million homes across the United States and their app has been downloaded to tens of millions of smartphones. NBCUniversal, Bain Capital, and The Blackstone Group together paid $3.5 billion in 2008 to acquire the Weather Channel

their friends and colleagues. DropBox didn't have to build their own audiences or craft marketing campaigns — they baked the existing social networks of users into their business practices, piggybacking onto them. In early 2013, just five years after launching, Dropbox was valued at over four billion dollars (Teixeira and Watkins, 2014).

from Landmark Communications. In light of such broadcast numbers and such a massive price tag, readers might be surprised to learn that the Weather Channel pays no fees at all for the weather data on which they run their services. They leverage government assets, paid for entirely by the American public. The weather data is gathered and distributed with satellites and databases belonging to the National Oceanic and Atmospheric Administration (NOAA), data that comes coupled with a suite of software tools for developers to integrate federal weather information into commercial applications. Commercial entities, when adding value in the form of services (such as making the data easily consumable for lay audiences in specific locations or for specific purposes), sell time and space to advertisers, making revenue off of public assets (Rogawski, Verhulst, & Young, 2016). The NOAA, in recent years converting their data to the easily accessible XML format and providing existing data free of charge to most commercial entities, has fueled the growth of an entire weather derivatives industry, in an inverse of its four-lettered counterpart NASA piggybacking onto the gravitational pull of other planets.

While the NOAA provides this data to most commercial entities for free, they recognize the importance of reinvesting in the future of innovative experimentation. To that end, NOAA embarked on a new kind of mutually beneficial public-private arrangement with a handful of select partners. Google, Amazon, IBM, and Microsoft entered with NOAA into the Cooperative Research & Development Agreement (CRDA). These few members of the CRDA pay marginal fees (not for existing data, but only incremental costs for gathering new data), and provide support in the form of infrastructure and computer processing muscle. Maria Patterson, Scientific Lead of the Open Science Data Cloud, described the groundbreaking nature of this organizational arrangement: "The entire project itself is its own research experiment — asking how can NOAA work with partners in a mutually beneficial arrangement to release data into an ecosystem."

Questions of loss in the NOAA case are blurry. While one could argue that the creation of a weather derivatives industry is an investment into the larger economy, with returns to be reaped over future taxation, looking at contemporary histories of tax legislation in the United States shows a different story: the statutory corporate tax rate has been reduced, from over 50 percent in the 1950s to 35 percent in 2013 (Hungerford, 2013). This illuminates a large-scale shift of wealth, from public to private coffers, only compounded federal agencies making data available to piggybacking by private firms.

Examples abound of private firms capitalizing on public expenditures. The pharmaceutical industry pushes the boundaries of how far private entities can go in co-opting assets to substitute for internal expenditures, especially since the 1980 Bayh-Dole Act. The Bayh-Dole Act allows publically funded research to be patented, so firms can privatize public expenditures (Mazzucato, 2015). Supported by this legislation, private firms can leverage public funds in lieu of spending on internal research and development. Sinking fewer dollars in R&D means firms distribute value back to their shareholders, and raise their share value via stock repurchasing. Pfizer in 2011 allocated the equivalent of 90% of its net income to stock buybacks (Lazonick, 2014). Meanwhile, federal research provided fully 88% of the most important pharmaceutical innovations between the early 1970s and mid 2000s (Block and Keller, 2011), meaning the public is more dependent on federal support of R&D than ever before, even while large pharmaceuticals continue to reap extraordinary profits.

Businesses have long leveraged public investment for private gain. One may ask how Möbius operations differ, for example, from how commerce utilizes state-funded infrastructure like roads, freeways, and bridge. The origins of key pieces of infrastructure, for one, show that questions of "who is building on whom?" have never been cut and dry, The interstate highway system, for example, while critical to modern industry, was originally funded through Eisenhower's rhetoric of defense.

But what does this strategy mean for the future of knowledge economies on the macro scale? We've seen how Amazon helped shoppers search for products in Amazon's inventory, drawing on Best Buy as a showrooming venue. Amazon did not have to build physical retail spaces. They benefitted from Best Buy's spending. By the time Amazon's tactics forced Best Buy to downsize, the public had been educated in handheld digital goods and e-commerce consumption habits. Amazon, then, has suffered no apparent ill effects from their operation. But the resource from which Amazon drew value fell into poor health. A similar asymmetry in the pharmaceutical industry endangers future innovation funding. As long as value is extracted from the State and privatized to shareholders, the State's ability to fund future innovation and bear the burden of risk is weakened. This is especially pertinent in today's high-risk knowledge economy, where so much research needs to be done before ideas can become profitable. Unlike the relationship

between Amazon and Best Buy, the role of the State will continue to be critical to the development of innovative technologies, and the viability of the United States as a global economic superpower.

We'll next explore some of the most radical Möbius firms, leveraging the resources and labor of their own users. In this segment we trace the co-option of an asset once at the very heart of the firm: executive labor.

III. The Organization and Its Users

Commodity logic has shaped the design and function of online communication platforms (Fuchs 2014; 2015), changing the distribution and character of labor in the information economy in ways that allow firms to leverage external, unpaid assets. First, the nature of work in the knowledge economy (i.e., hyper-connected work involving computer-based communication, rather than physical labor) is immaterial (Lazzarato, 1996) and abstract (Marx, 1867). Second, mechanisms of economic surveillance shift more daily-life actions into the realm of value-producing labor, troubling boundaries between "work" and "non-work" (Terranova, 2000). So, too, the boundaries of firms in this sector become nebulous and dispersed. The more value they can draw from external networks or audience labor, the fewer resources they must expend internally. Internet-based platforms can ask crowds of interested users to furnish feedback on a product, or ideas for new technological applications, drawing on the value of "communities of practice" (Wenger & Snyder, 2000) for "user innovation" (von Hippel, 2005). While the conscription of digital labor is already widely theorized, key for our purposes is our observation that some Möbius organizations integrate user labor into the managerial workings of the firm itself: authority relations resting at the core of the firm (Bryce & Singh, 2001). The potential consequences and risks of such leveraging of external resources are understudied, and already rendering surprising impacts on some young organizations. While coordinating distributed production among multiple parties is already a hurdle even for networked firms, which are carefully governed and incentivized (Kraakman, 2001; Demil & Lecocq, 2006), the Möbius form eliminates these steering structures. Such elimination compounds risks in audacious ways. Walter Powell, in his recent treatment of crowdwork, one popular Möbius tactic, described its tradeoffs as "Security and formality [...] replaced by openness and precariousness" (Powell, 2016).

Still an emerging practice, crowdwork can constitute different types of activities (Schenk & Guittard, 2011). For the purposes of this research, we group these into roughly three models we see dominating most crowdwork companies and how they conscript the labor of their users on digital platforms. Two are the "user-as-tinkerer" and "user-as-producer" models. The third, most thoroughly progressive, and arguably riskiest, is the "user-as-manager". The "user-as-tinkerer" model incorporates the labor of users as one stage in a long developmental process. Popularly known as "open source" or "open innovation", this is an increasingly pervasive strategy in the technology sector, especially in software development's iterative release schedule. One stage of this process, called "beta testing" (Neff & Stark, 2003) sees the firm produce a product and then deploy the user base as a testing ground. Software packages are increasingly being released early to specially selected groups of users (after initial "alpha" tests are completed in-house). These "beta" testers are asked to hunt for bugs, errors, and areas for improvement in new software products, work that once would have been done inside the company. Testers are rewarded not with monetary compensation but with social capital (Bourdieu, 1986/2011) through their exclusive status, and personal fulfillment from contributing to the development of a product they liked. This status, and sense of belonging, is usually established within their community of software fans and aficionados. These communities, in a world seeing falling rates of participation in community institutions such as churches (Putnam, 2000) play an increasingly important social function in the lives of these beta testers.

Software engineering acts as an inspirational template for organizing assets and labor, by embracing iterative, continuous development (Neff & Stark, 2003). The advent of cheap personal computers and the penetration of affordable, fast internet access make this model accessible to more firms, as more minds are available for knowledge work than ever before. Quickened further by the prevalence of internet-enabled smartphones, human computing is one subset of the increasingly liquid global labor market, facilitating novel opportunities for new boundary work for organizations. Some of these experiments use classic organizational arrangements in digital form. Amazon's Mechanical Turk, for example, is a website where labor is purchased in the traditional sense, just on a new kind of platform and in smaller increments. Simply

purchasing labor from the market on a contract basis, i.e., Coase's notion of the conditions under which a firm can emerge (Coase, 1937) is not a new form of organization, but rather an example of a classic brokerage. There are other tactics emerging which, like beta testing, push the boundaries of what is considered "work" and a "worker".

Converting user activity into value blurs distinctions between work and non-work as unpaid users in digital spaces generate valuable information and data commodities (Fuchs, 2014). A pervasive tendency in contemporary capitalism, this is a defining Möbius tactic. Google capitalizes on information generated by its popular "free" services. GOOG 411, Google's free directory service, was launched in part to train speech-recognition algorithms, later implemented into its Android phone devices and Google services for iPhones. Anyone who used GOOG 411, speaking business names out loud to Google's listening computers, contributed valuable data to the development of future money-making products. Google further leverages user labor (Lazzarato, 1996; Terranova, 2000; Fuchs, 2014) in the sign-up requirements of their free email service. When registering for an email account, users follow several steps. In one of these steps, people "prove" they are human, not robots that a hacker might program to register fake email addresses. To verify their humanity, users take a test called reCAPTCHA, the "Completely Automated Public Turing Test to tell Computers and Humans Apart." In the test, scrambled images of two words are shown on the computer screen, and users read the words and type them into corresponding text fields. Robots fail these tests because computers cannot yet "read" text inside images. Unbeknownst to the Google users, however, the reCAPTCHA test only needs the first word. The second word isn't part of the test. It's a word Google needs transcribed for their digital book-scanning project. Users, typing out the words they see, are actually doing transcription work on behalf of Google.

A lawsuit was brought against Google for this practice. The complaint was primarily with Google's lack of transparency, in not alerting users that they are creating profits for the firm: "In sum, Plaintiff alleges that Google does not tell users that it profits from the reCAPTCHA prompt transcriptions, and that by misrepresenting or omitting that fact, Google extracts free labor from users." Grounded in definitions of work and the identity of an employee, the plaintiff's argument was that Google's reCAPTCHA practice violated state employment policy, and that people should be paid for their work.

Google's defense was multi-pronged. First, they argued that California's public policy stated only that *employees* need to be compensated for services, that the definition of an employee hinged in part on the magnitude of their labor, and that measured with this metric, the plaintiff was not an employee. Magistrate Judge Jacqueline Scott Corley agreed, writing in her decision:

> Defining labor as "labor, work, or service whether rendered or performed under contract, subcontract, partnership, station plan or other agreement if the labor to be paid for is performed personally by the person demanding payment"); § 350 (defining "employee" as "every person [...] rendering actual service in any business for an employer, whether gratuitously or for wages or pay"). Plaintiff fails to cite to any case that supports her theory that a non-employee transcribing a single word is owed compensation [...] it would need to be a broad policy to require what Plaintiff alleges — that a person who types a single word as a condition for receiving a free service is entitled to compensation for such "labor."[3]

Judge Corley also agreed with Google that reCAPTCHA labor is too minute to re-classify employment status. Google further argued the employees could also be administratively defined, and that the very lack of any kind of formalized contract further negated the plaintiff's claims to compensation. Because there is no contractual agreement between the two parties, plaintiff was not automatically entitled to share in profits garnered from that arrangement. The judge agreed again, and dismissed the suit.

Google's use of Möbius tactics, leveraging an external asset without any agreement or contract, was a pillar of support in their case. Möbius strategies became boundary work, pushing the border of how and when companies could use the labor of users, reshaping the contours of the firm. Google co-opts an asset in such a novel way that an actor (the user) in their organizational network required the intervention of a legal institution to redraw the borders of "labor" and an "employee". The court found in favor of the Möbius firm. In the age of distributed human computing, when private companies can aggregate individual digital microtasks into significant value (Fuchs, 2014) this legislation is a ripe opportunity.

3. Rojas-Lozano v. Google, Inc., 15-cv-03751 (N.D. Cal. Feb. 3, 3016).

Other companies deploy the "user as producer" (Neff & Stark, 2003) or crowdsourced model, where instead of performing labor on the content built by the company, users supply the content themselves. Many sites harvest crowdsourced content: Wikipedia, YouTube, Twitter, Facebook, SnapChat, SoundCloud, Instagram, and Pinterest, just to name a few, all work on the "user as producer" or "prosumer" (Toffler, 1981) model. The labor entailed in these blending relationships has been popularly theorized. An array of fields have produced literature on digital labor and its implications, including studies in science and technology, media and communication, sociology, and economics (Matias, 2016; Lazzarato, 1996; Licoppe, 2008; Terranova, 2000; Fuchs, 2014).

Other firms move beyond the user-as-producer model, to the user as manager. Leveraging external managerial labor via a community of users can create new opportunities; but it can also introduce novel forms of risk. As we shall see, deploying community members as managerial labor can realign power relations and foster unpredictable interactions between users and the firm. These realignments spark potential struggles between users and firms, between community and capital, striking at the heart of a theoretical tension in community-based forms of innovation so popularly celebrated by contemporary enthusiasts (Benkler, 2006; Castells, 2011). Paul Adler describes such tensions as a polarization in the field of organization studies, between

> those who see community as a primordial feature of persistent human collectivities, including businesses [...] [and] those who see power asymmetries as a fundamental feature of social structures [...] [who] critique as essentially obfuscatory any affirmation of bonds of community within industry (Adler, 2015, p. 446).

Adler's observation of clashing interests between community-based solidarity and capitalist relations of production can have a destabilizing impact on firms whose value is grounded in this kind of labor. One starkly visible case study in such destabilization, widely recorded in the popular press as a watershed moment for rethinking the management of community-driven innovation, happened on a website called Reddit in 2015.

Reddit is a crowdsourced internet platform resembling a bulletin board. Most of Reddit's users subscribe to one of two tiers of membership: "users" can upload links and post comments, whereas the second tier, "moderators", work a management role, via a managerial toolkit provided by the platform. Mods can alter the structure and rules of their group via HTML code governing design and interactivity. Mods set rules governing user behavior through comment etiquette standards and banning policies. To manage their groups, mods can delete posts, delete comments, ban users, and control whether their group was visible to the public. In their management of the platform infrastructure, content, and community, mods largely build the site themselves. Through their tools they took up managerial work, becoming managers on behalf of Reddit the company, except with no compensation. While spending comparatively little on community management, Reddit scaled up to over 150 million page views per month by 2016 (Traffic Statistics, 2017).

This radical application of Möbius tactics, however, held unforeseen risks. In 2011, some users engaged in an early protest of what they saw as a rise in promotional material on the site. Creating a community called "Hail Corporate", users derided posts that they saw as corporate advertisements disguised to resemble organic conversations. Such visible disassociation with corporate goals embodies an externalization of cynicism, or a form of "symbolic sabotage" in a reorientation of relations between the worker and the firm, re-pathologizing the organization by relocating the position of "defect" in what has been termed a move from "the 'tired employee' to the 'exploitative organization' " (Fleming & Spicer, 2003).

Symbolic sabotage soon led to their first actual sabotage. In 2014, a mod of a gaming sub became unhappy with the way a game company was beta-testing a new release. To try to influence the company's actions, the moderator "blacked out", or took totally private, the entire gaming subreddit — an often integral site for word-of-mouth marketing by gaming companies. The mod replaced the entire board with a picture of a lock and key, what's also known as "going dark". It was only after Reddit employees intervened that the board was restored (Matias, 2016).

In 2015, friction between the firm and users produced even more remarkable dissonance. That summer an employee of Reddit named Victoria Taylor, the communications manager and often only point of contact between moderators and the company, was let go, with no warning given to the moderators

with whom she interacted. Moderators of subreddits relying on Taylor privatized their boards, in the same "going dark" strategy used in 2014. In an Op-Ed for the *New York Times*, two moderators wrote:

> Reddit's management made critical changes to a very popular website without any apparent care for how those changes might affect their biggest resource: the community and the moderators that help tend the subreddits that constitute the site. [...] We donate our time and talents to Reddit, a for-profit company, because we truly like building cool things on the Internet for others to enjoy. [...] Dismissing Victoria Taylor was part of a long pattern of insisting the community and the moderators do more with less. [...] We are concerned with what a move like this means for for-profit companies that depend on the free labor of volunteers (Lynch & Swearingen, 2015).

The protest snowballed, with both mods and lower-tier users becoming vitriolic with their accusations of impropriety against Reddit, including a violent surge of hate speech directed in particular at new CEO Ellen Pao. In what has been widely termed the "moderator blackout", more mod shut down large sections of the site and kept them dark, cutting off traffic and ad revenue. This movement flipped the frequent characterization of digital labor, that such work embodies "new forms of labor but old forms of exploitation" (Bucher & Fieseler, 2016; Fuchs & Sevignani, 2013; Paolacci et al., 2010; Scholz, 2013), on its head.

In the uproar Pao resigned. Before her resignation, she posted the following comment on Reddit:

> The bigger problem is that we haven't helped our moderators with better support after many years of promising to do so. We do value moderators; they allow Reddit to function and they allow each subreddit to be unique and to appeal to different communities. This year, we have started building better tools for moderators and for admins to help keep subreddits and Reddit awesome, but our infrastructure is monolithic, and it is going to take some time. [...] We hired 5 more people for our community team in total to work with both the community and moderators. [...] As a result, we are breaking some of the ways moderators moderate. We are going to figure this out and fix it (Pao, 2015).

To get a broad picture of community participation and moderator mindset, J. Nathan Matias, a researcher at the MIT Center for Civic Media, conducted extensive interviews with moderators and built a dataset of subreddit activity during the blackout. Through a framework of social movement theories, including political opportunity and resource mobilization, his work affirmed that the uprising was an organized action in response to collective grievances. He found the most significant predictors for a moderator joining the blackout to be twofold. First was their workload. The larger the workload of the subreddit, (measured in number of comments as a proxy for the amount of "activity" in the group) the more likely the moderators were to join the blackout. This affirmed the statements made by moderators on Reddit and in the popular press: the more difficult their jobs, the more likely they were to revolt. The second predictor was the number of ties to other communities, held by both the subreddit and the moderator. The more people and boards they were tied to, the more likely they were to revolt. In their statements during and after the blackout, mods described ignored requests for more support and better technical tools: "The moderation tools on Reddit are another of the larger contention points between the mods and admins — they are frequently said by those who use them often to be a decade out of date."

Strife between these groups has only increased in the time since. In 2018, special counsel Robert Mueller filed an indictment against a group of Russians, including the Internet Research Agency, a company associated with the Kremlin, for running disinformation campaigns in an attempt to influence the 2016 American presidential election. The indictment mentioned Reddit thirty-five times as a site of such disinformation sowing. Steve Huffman, the CEO, admitted that Reddit had "found and removed" hundreds of accounts associated with Russian propaganda efforts (Marantz, 2018), and the *Washington Post* reported that Reddit executives were being questioned by a Senate Intelligence Committee (Romm, 2018).

At Reddit, unpaid users occupied crucial administrative roles. This is the key leap forward (and the key risk) in the Möbius organizational model: external actors could manage Reddit's executive assets, including human capital and the functional infrastructure of Reddit itself, through what Callon and Muniesa would call executive organizational equipment (Callon & Muniesa, 2005). Granting managerial tools to

users created new vulnerabilities, allowing users to express their values in ways that diverged from the business intentions of the designers (Adler, 2015). When the intentions of the organization and the resource they attempted to co-opt — their users — became misaligned, community-based moderators appropriated affordances (Nagy & Neff, 2015) to bring the activities of the firm to a halt. Later, user-based control of the platform was exploited by malicious actors running a disinformation campaign, arguably leading to one of the most shocking election outcomes in modern times.

Conclusion

As we've observed, the information economy has pushed the organizational form to novel frontiers, allowing firms to exploit opportunities across categories of labor, infrastructure, and assets.

We have broadly observed three distinct types of the Möbius form: the co-optation of *assets of other private firms*; the capitalization, by private industry, of *assets produced by state actors*; and the managerial *labor of their own users*.

A recent space probe mission by NASA serves as another metaphor for this process. A resource they've leveraged to their advantage is the gravitational pull of other planets. Orbital mechanics, as the underlying science is called, is also known as Gravity Assist, or the process of using the gravity of another planet on top of the rocket's own fuel-based propulsion. NASA's Voyager missions were engineered using Gravity Assist. In 2012, the Voyager missions lobbed a manmade object farther into space than ever before in the history of mankind. NASA needed a propulsion resource, located that resource in the gravitational pull of other planets, and wove their spaceflight plans around that asset. In 2016, we've observed earthbound firms similarly folding their companies around assets they don't own, don't use cooperatively, and don't buy from the market.

Resembling Gravity Assist, Möbius firms don't buy, manufacture, or cooperatively exchange with the resources upon which they're built. This experimental new era for organizations was facilitated by tools of ubiquitous computing, connecting more actors than ever before. These digital infrastructures have permitted organizations to co-opt existing assets in unforeseen ways. In our examples, they mitigate internal costs of marketing development, app development, and community management. While there are still costs involved (building and maintaining the technical layer of Reddit, for example, requires investment in personnel, server space, and computing), the enormous savings garnered by charging users with managing themselves, and the novelty of the relationship between the firm and this co-opted entity, cannot be ignored. Co-opting such assets allows these firms to piggyback onto existing communities of users and structures of access, facilitating economies of scale without "meta-corporate" arrangements (Sabel, 1991). These advantages suggest that the Möbius form may well represent a new operational paradigm.

No organization can be completely without boundaries (Schreyögg & Sydow, 2010). Möbius firms are no exception. They file taxes, maintain bank accounts, and remunerate their employees. As organizations must, they embody processes distinguishing them from their ecological surroundings. Our primary interest is not on boundaries, per se, but the actions taking place about them. With neither market contracts nor partnering alliances, the organizational "action pattern" (Schreyögg & Sydow, 2010) of the Möbius is to co-opt the organizational actions of other entities in their environment. This produces a novel type of firm-to-firm relationship, absent the formal markers that customarily define the firm. Such practices, taking place over, above, and in defiance of "boundaries" between a firm and other actors in its environment (Whitford & Zirpoli, 2014), reveal a form more radical than has been described in the networked organization literature. The primary question that intrigues us, prompting us to adopt the Möbius metaphor, is this: assets which are doubtless *external* to the firm, and remain external to it (i.e., they are not purchased and brought inside the firm, nor are they incorporated by a partnership arrangement), are nonetheless *vital* to its operations and its identity. This has created the need for new language to discern and describe firm activity.

Other contributions made here include an expanded conception of objects and actors in the era of Big Data, in a novel application of actor-network theory. Big Data, rather than a mutable object transferable between or across firms, can be re-conceptualized as a static object around which firms sculpt themselves and their strategies. Viewed in this framework, the boundary object is not Big Data but the organization itself.

Future research potentials are rich. One area of interest is the array of response patterns of organizations being co-opted. In our observations, co-opted users leveraged their collective power more substantially than co-opted firms, whereas the state chose to permit co-optation and even encouraged it. What do these responses suggest about relations between firms, their shared ecologies, and resulting patterns of power and contingency? Fresh challenges to organizational sociology are also presented by the advent of platform-based services, and the migration of institutional logics as embedded inside co-opted assets. In this vein, a new area of organizational sociology engages micro-sociological theory, particularly inhabited institutionalism, to examine how individuals within an organization enact a complex and multi-layered set of obligations, logics, and beliefs (McPherson & Sauder, 2013).

Far from being an exhaustive cataloguing of an emerging trend, in this paper we've discussed the shifting contours of these developments by loosely identifying three types of co-option leveraged by private companies. Traditional theoretical language used to talk about boundaries does not capture the action patterns we see happening here of organizations mutating to incorporate new imaginaries of the firm, challenging what we know and how we talk about digital economies, networked organizational identity, and the role of the firm in the Information Age.

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