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Sociology of Work and Organizational Structure

Platforms, Protocols, and Permissibility

A comparison of economic forms, conditions, and effects

Abstract

We find digital platforms entangled in many aspects of life in the 21st century, online and offline. Their contained ownership and patterns of value extraction have led many observers to question the value they provide. These platforms are built on top of protocols that operate differently. The open internet won out over licensed software after scientists at CERN released the protocols we use today into the public domain (CERN, 1993). This paper explores the dichotomy of platforms like Uber or Twitter, and contrasts them with protocols and the tools they enable. Drawing on the history of the World Wide Web and economic literature on firms and open source development, I outline an alternative to the platforms common today. I explore the factors that encourage these two modes of production, as well as the effects that emerge in their wake.

Introduction

Life has changed significantly since the turn of the century and the dotcom boom. A worker might roll over in the morning to check their preferred flavor of social media from a phone likely running software developed by either Google or Apple. They might catch an Uber or Lyft to an office, where they check their email and browse various news sites from a Microsoft computer. These various technologies are highly interoperable at times, and walled-off gardens

at others. Imagine if your Microsoft computer restricted you to apps, browsers, websites, and emails only created by and for Microsoft users? Or the opposite scenario, if iMessage (an Apple-exclusive, internet-enabled, end-to-end encrypted messaging service that mostly replaced SMS) were interoperable with features on Android phones? If, when your favorite micro-blogging site was bought out by a controlling billionaire, you could migrate to an equivalent, bringing your followers and network with you?

The world we live in operates on a mix of interoperable protocols and black-box platforms. How did we get to the point we occupy now, with an open internet? Why are some platforms so closed off, when some of the most significant societal gains in recent decades were the product of open protocols? Even as some platforms operate on closed business models, what motivates them to venture into the world of open source, as Meta has with Llama, open-sourcing their large language models when neither of their competitors have (*Meta Llama*, n.d.)? What would it look like if ridesharing were an open protocol, rather than a closed platform? It is these questions that motivate this paper. In an effort to understand the dynamics of these meta-interactions, I analyze examples of these two forms, providing a conceptual framework to aid in discussion.

This paper begins with background on these forms, from the Coase's (1937) theories that explained the separation of the firm from the market, to Powell's (1990) conception of networks as a third economic form, distinct from the transactional continuum. Building on these categorizations, Vallas & Schor, in 2020 provide an analysis of platforms as another distinct form. In addition to modern platforms of the gig economy, I revisit the early internet to resurface the early platforms that connected users to the internet before the days of the world wide web. The paper then turns to protocols, from HTTP and SMTP, providing us with the open web and platform-agnostic email respectively, as well as the modern case of blockchains and pre-technological protocols re-examined by researchers via the Summer of Protocols, from shaking hands to traffic rules (Rao et al., 2023).

With this background in mind, I then propose a conceptual framing of platforms as firm-operated markets, and analyze the properties that platforms exhibit from each form and those that emerge from their interaction. While protocols offer similar functionalities as locations of exchange, their networked ownership sets them apart from platforms. After exploring these framings and some comparison between the two, I engage with several examples, looking at the cross pollination between platforms and protocols, and explore the hypotheticals of replacing certain platforms with protocols and vice versa. Through this framing and research, I hope to complement the current push for protocol-focused studies, as well as the literature on platforms and their economic behavior, and better understand where and why these forms exist in the greater economic landscape.

Background

Markets and Firms

In 1937, economist Ronald Coase published his thesis on "The Nature of the Firm," which uncovered the reasoning behind the formation of organizations and partnerships (Coase, 1937). By surfacing this distinction, Coase created a boundary in economic discussion between that of market interactions and those of a firm. Markets operate via the interactions of independent actors, each making well-informed decisions based on a price governed by supply and demand. Markets are permissive, and relatively efficient at allocating resources (Kamien & Schwartz, 1975), but come with their own price that Coase terms "transaction costs" (Coase, 1937). Operating in these markets requires finding, negotiating, and enforcing contracts, which make up these transaction costs. A firm's justification for existence is to side-step these costs, by coordinating internal transactions administratively, rather than letting the market dictate interpersonal interactions. By removing the costs of determining the terms of interaction, firms

allow for more fluid collaboration and gain economic incentives to widen their net (Williamson, 1976).

These two organizational forms vary on their governance, how information is disseminated and the role that contracts play, and their flexibility. While markets' pricing mechanisms are governed by supply and demand, firms govern through a hierarchy of command. Firms are more apt to sharing information internally, while markets have no guarantees that information won't pool asymmetrically. Markets require a new contract for each transaction, driving up costs but formalizing each interaction, while employment at a firm typically consists of only the employment contract, with less formal interactions within the firm. The lower barrier of entry in markets along with their free association allows for significant flexibility. Firms, on the other hand might acquire bureaucratic inertia, stifling their responsiveness, or they might benefit from management's foresight and ability to allocate resources on a whim, rather than waiting for pricing mechanisms to adapt to new situations. Both of these concepts, though, revolve around cost as the basis of their existence. Despite the revolution in economic thought that followed Coasean transaction cost theory, there was still more to be discovered about the basis of organization and interaction beyond these paradigms.

Theory of the Network Form

Economic thought for the next 50 years was largely occupied in modeling the economy based on these two forms of interaction. Yet in the digital age, the internet drastically reduced the costs of information transfer, throwing a wrench in this binary model. In 1990, Walter Powell published a paper describing a new form that was "Neither Markets, Nor Hierarchy", which he termed networks. Networks are characterized by "reciprocal patterns of communication and exchange" (Powell, 1990, p295). In contrast with market transactions or hierarchical governance, network-based coordination is open and collaborative, with information readily

shared between nodes. They reduce transaction costs in a similar fashion to firms, but via mechanisms of trust and collaboration rather than command and hierarchy.

The theory of the firm pits markets and hierarchies at opposite ends of a continuum, where the logic of transaction costs determines where an organization falls on that spectrum. Powell found this framing unsatisfying, disagreeing with the assumptions that economic relations begin with markets and end with hierarchy (Powell, 1990). Indeed, anthropological evidence points toward significant evidence on the contrary, that social and moral relations predate markets and even the convention of currency itself (Graeber, 2011). If our interpersonal relationships are more complicated than simple transactions, this simple description of organizations along a spectrum of transaction costs cannot fully explain our methods of interaction and organization.

Powell's concept of networks arises out of the types of interactions that defy economic categorization. Highly personal and difficult to quantify transactions, embedded in social and reputational networks operate outside of this axis described by Coasean economics. The rules of interaction within high-trust, collaborative networks are starkly different from those in cut-throat markets. While a market exchange allows for minimal trust, networked interactions thrive on mutual trust and reliance. Graeber, in his history of debt (2011), describes the networks of indebtedness that cultures used to build their societies - zeroing out your debts would remove your connection to your neighbors and result in social cauterization, yet this is the baseline logic in markets.

Networks, in contrast, embrace the social web they find themselves embedded in. Networks are not exclusively economic ventures, but take into account the reputational, moral, and reciprocal value structures of these individuals and their interactions. They are formed for long time horizons, in comparison to the instantaneous market transaction, or the firm focused on this quarter's profits. Networks encourage the sharing of information, while competition in the market or between firms lead to hoarding it. Networks are generally more prosocial than

their hierarchical counterparts (Moyal et al., 2023). When considering the role of stewarding and enabling interactions, the organizational form in charge has significant downstream effects on those interactions.

The Rise of Digital Platforms

With the rise of the digital age, digital platforms have emerged as firms find market opportunities to facilitate interactions and transactions of their users in new marketplaces. The original platform could be traced back to the first usages of the term "market", in 12th century England as a location declared by the nobles for the sale of goods (Agnew, 1986; as Powell, 1990, mentions, the nebulous concept of "the market" doesn't materialize until the late 18th century). Using this concept of a market, platforms from eBay to Uber are clearly specific instances of markets operated by firms for profit. Even "the market" itself, manifested as the various stock exchanges around the world, are specific locations (whether in physical or digital space) operated by institutions such as the NYSE.

Vallas and Schor (2020) argue these platforms constitute a fourth organizational category in addition to the three discussed in the last two sections. While they exhibit some characteristics of these forms, their configurations yield unique governance mechanisms. Their model, of platforms as "permissive potentates", describes them as firms that cede control over certain aspects of the interactions in their markets (Vallas & Schor, 2020). While firms capture value through mediating the exchanges they enable, they also allow for market interactions, outside the boundary of the firm; this strategy sets them apart from the firms of the past with their large internal workforces (Davis, 2016).

Platforms take many forms, in each case connecting providers with consumers. In the case of eBay or Amazon, the exchange of goods is facilitated, while in the platforms of the gig economy, services are exchanged. On capital platforms, users can rent your car (Turo) or a spare room (Airbnb) (Schor, 2014; Vallas & Schor 2020). Social media platforms provide an

avenue for exchange forgoing the transaction, and instead monetize through the sale of the attention they capture (Wu, 2016). In all of these cases, however, the platform is owned by a firm, enabled by the software it develops and hosts. In the sections that follow, we find that exchange can be facilitated in other organizational structures that are not captured by firms.

The Longevity of Protocols

Protocols enable exchange in a similar fashion to the platforms described in the previous section. For the purposes of this paper, we define protocols simply as a set of rules constraining communication. These constraints, counterintuitively, facilitate communication. For example traffic rules, a protocol restricting the ways drivers and vehicles operate on the road, smooths and speeds up travel on roadways. With a set of rules to define how communication proceeds, software can be developed to automate much of that communication, as has happened over multiple layers of Internet Protocols (“Communication Protocol,” 2024). While the outcome of facilitated exchange is similar for participants of platforms as they are for protocols, the governance of such spaces are vastly different. A platform, owned and operated by a closed firm, leverages the efficiencies of the firm to develop the platform and the tools that enable it. A protocol, in contrast, can rely on networks or bazaar governance (Demil & Lecocq, 2006) for their stewardship.

Both platforms and protocols create marketplaces, locations for exchange. Platforms like Uber connect drivers to riders, eBay connects sellers to buyers, and protocols like HTTP connect servers to clients, SMTP connects mail servers to one another. Protocols span far beyond technical networking protocols, however (Rao et al., 2023). Their nebulous nature evades encapsulation by a firm (if not explicitly licensed as free), in contrast with platforms closed off to outside experimentation. The protocols of the open web are workshopped by groups like the Internet Engineering Task Force (IETF) and the World Wide Web Consortium (W3C) (“Communication Protocol,” 2024). Blockchain protocols like Ethereum are often

stewarded by a foundation in concert with several organizations that implement these protocols (*Ethereum Foundation*, n.d.). Traffic law in the US varies by state, and follows the model of a "uniform act", where state law is proposed by the National Conference of Commissioners on Uniform State Laws ("National Conference of Commissioners on Uniform State Laws," n.d.). Cultural protocols are often (but not always) simply norms adopted over time, and language itself can be considered a protocol that may be stewarded by an organization (as is the case of the French Academy) or may evolve through its common usage.

Protocols are under-studied and evade clear definition (Rao et al. 2023), but in some ways, protocols run parallel to platforms. Platforms are a specific type of market, a location for exchange, or a set of tools or landscape that enables such exchange. Protocols, too, are a site of exchange, but at a juncture of roads on public land, rather than on private property. In the following section, we explore this comparison further, later outlining examples of this dichotomy.

Frameworks of Exchange

Platforms have been described extensively (Schor, 2014; Kornberger et al. 2017), their open nature relative to comparatively closed firms (Wang et al., 2020), their impact on worker subordination & resistance (Wood & LehdonVirta, 2021), and their ability to govern users (Shestakofsky & Kelkar, 2020). While firms like Uber are often the focus of such literature, a range of organizational structures exist (Kirchner et al., 2022; Cañada et al. 2023). Regardless, platforms tend to operate as a Braudelian "anti-market", tightly controlling their monopoly to the firm's favor (Peck & Phillips, 2020). Defining a market as a location (physical or digital) of exchange, this paper focuses on an angle that defines platforms as firm-operated markets. By spinning up a new market, or an easier market, and facilitating exchange, these firms are able to charge for their usage. Especially with the opacity afforded by closed-source technology, these firms are able to adjust their cut without input or awareness from the stakeholders at the other end of the deal. Within the context of profit-centric economics, the inevitable result is the

"enshittification" of these platforms (Doctorow, 2023). It is this widespread critique of the disproportionate power exercised by platforms that motivates this paper and other calls to consider protocols in their place (Masnick, 2019).

Table 1. A Powellian comparison of platforms and protocols across several key features.

<i>Key Features</i>	Platforms	Protocols
Ownership	For-profit firms	Non-profit, public domain
Governance	Internal, usually closed to the public	Open for public comment / forks, co-governed by multiple stakeholders
Adaptability	Faster, but determined by the firm and usually profit-motivated	Slower, if not stagnant. Requires wider stakeholder buy-in and legacy support.
Visibility of internals	Private (usually)	Public
Interoperability	At the discretion of the firm, may be enabled for arbitrary fees or disabled on a whim	Allowed; tooling may or not be built by a community rather than through official channels
Trust and Security	Firm is the weakest link; security prone to social engineering	Security can be implemented separately due to interoperability, required for secure transactions
Legal implications	Firm holds the responsibility, outside of specific legislation abdicating (e.g. Section 230)	Creators sometimes held responsible but distributed nature limits ability to regulate or point blame
Economics	Licensed, fee-for-access	Free, run by foundation or non-profit

Ownership, Governance, and Adaptability

Platforms are owned and operated by firms. These firms maintain full control, and while they cede control arbitrarily to their users, the line that's drawn is entirely within the firm's purview. In contrast, protocols are often released into the public domain, or licensed via "copyleft", a form of copyright that ensures public access and usage rights. Platforms' governance is accordingly internal. Decisions about how these platforms are operated may

take user input into account, but the final say is reserved to the firm that owns the platform. Protocols, on the other hand, may have steering committees or a task force with multiple stakeholders tasked with engineering future directions. Many protocols and programming languages incorporate requests for comment (RFC) (Flanagan, 2019), allowing public input directly into the process of governance. Many protocols have public meeting notes or email chains that have been archived for historical purposes (e.g. Postel, 1979). While little research exists specifically on the governance of protocols, there are many parallels that can be drawn from the literature on the governance of open source software (Markus, 2007; Demil & Lecocq, 2006).

As a result of these structures, these two forms have different capacities and affordances for adaptability. While a company may decide to update its platform or pivot entirely, protocols don't have the same maneuverability (Papastergiou et al., 2017). Firms are able to quickly add or remove features due to their centralized governance and verticalized, in-house technology departments. Protocols, on the other hand, may have multiple downstream implementations under different ownership that will not be able to move as quickly. As a result, updates or changes to a protocol must consider legacy implementations and support compatibility with previous versions of the protocol. One example is Python's transition from version 2 to 3, where after 10 years many projects still had yet to convert to the newer standard (Malloy & Power, 2019).

Visibility of Internals and Interoperability

Closely related to the configurations described in the previous section, platforms and protocols differ in their visibility and interoperability. These features describe the ability for a member of the public to view these internal decisions and mechanisms, the inner workings of a platform or protocol, and their ability to create software or other tools that are able to interact. On both of these counts, protocols are visible and fully interoperable due to their transparent

nature. Firms, when they decide to do so, may provide tooling to encourage interoperability, making it easier for the public to integrate, but this is generally only done as a result of profit motive. In many cases, firms avoid transparency or interoperability in order to keep customers locked in (Dailey, 2021). When firms do decide to allow these interactions, control still lies with the firm, and terms may change unpredictably (Mehta, 2023).

Trust, Security, and Regulation

Security is often a technology firm's highest concern. Data breaches are common, and may have negative impacts on a company's reputation. While these firms often have entire departments dedicated to security and another for legal and regulatory compliance, protocols don't. This results from a difference in the architectures of protocols and platforms. Platforms centralize risk and responsibility within their controlling firm. These firms own servers, store passwords and other sensitive data, and are held legally responsible for infractions like copyright violations on their platforms (Ballon, 2019). Protocols, on the other hand, push this responsibility to the edges of their network; they generally don't have an entity in charge in the same way. While a bad actor might utilize HTTP or a messaging protocol for illicit activity, the protocol designers are not at fault. An interesting caveat to this is the cryptocurrency space, where the financial aspect of these protocols lend them to greater scrutiny. Certain protocols have had founders found responsible for fraud (*Terraform Labs PTE, Ltd. and Do Kwon*, 2021), and the question of facilitating sanctioned transactions on the Ethereum blockchain has put node operators in a gray area (Kessler, 2023). The public nature of these protocols requires that security be built into the communication. Firms can take shortcuts by acting as a "trusted" mediator of exchange, protocols must be "trustless" (BCB Group, 2022).

Economics of Platforms and Information

The economics of these forms is the source of many of the downstream distinctions between them. The for-profit nature of platform-oriented firms means they both have more resources to deploy in order to provide a better service, and are motivated to act in antisocial ways for the sake of that profit. Protocols, on the other hand, are freely available, which both allows them to be ubiquitous and stifles their innovation due to a lack of resources to start with.

Today's platforms are largely a product of venture capital, where investors supply investments for years before a company becomes profitable, expecting that shoveling money towards growth and capturing a market will allow for a significant return on that investment (Srnicek & De Sutter, 2017). This has facilitated development of a number of platforms, but is also the source of an eventual pivot towards profitability as the focus of these platforms, rather than their users or the services they provide (Doctorow, 2023). These platforms operate largely on market logic, relying on, especially in the digital realm, artificial scarcity to turn a profit for the services they provide and the exchange they facilitate.

Protocols instead eliminate that scarcity through open license for usage. This can allow them to flourish relative to licensed counterparts (see the later section on HTTP), but it also eliminates a revenue stream. Simple economics shows that when supply is infinite, the cost is zero. Some have pointed out the contradictions this provides to Coase's models (Benkler, 2002) and others have explored business models around data commons (Potts et al. 2024), but the application of this research for protocols remains under-explored in literature, especially in comparison to that of the proprietary firm. This is a core issue of the sustainability of open source development, and issue with information-based services and labor (Aubry, 2024; O'Neil et al. 2021). While it's clear that profit motive can lead firms away from providing valuable services, an alternative, economically sustainable route is not readily available.

Contemporary Case Studies

In this section, we explore several examples that highlight the divergent behavior of platforms and protocols. These examples raise more questions than answers, but illuminate several instances of platforms like iMessage, early AOL, or Twitter, and their comparisons with protocols such as RCS, HTTP, and ATProto, among others.

iMessage and RCS

In the early days of cellular technology, SMS (Short Message Service) was developed to take advantage of the capabilities cellular towers provided to transmit short messages. SMS is a communication protocol, allowing universal adoption by cellular devices, and is governed by several organizations including the 3rd Generation Partnership Project (3GPP), the International Telecommunications Union (ITU), and the European Telecommunication Standards Institute (ETSI). Developed in the 1980s and debuted in December of 1992, SMS is now over 30 years old and in 2010, 6.1 trillion messages were sent. Despite its wide adoption, SMS has only a basic featureset, with messages limited to 160 characters in specific encodings. As a result, several platforms and protocols have been developed to challenge its dominance ("SMS," 2024).

More exist than are mentioned here, but a notable challenger is Apple's iMessage. iMessage is a platform for messaging between iOS devices, and is closed to non-Apple devices (Pierce, 2023). Apple's market dominance has significant social effects that result from the visual othering of "green bubbles" that travel via SMS, in contrast with the feature-rich "blue bubbles" of iMessage (Dvorsky, 2022). iMessage does supply several improvements over SMS: messages are encrypted end-to-end and travel over the internet, while SMS is restricted to a cellular connection. The ubiquity of iPhones and iOS devices means that conversations between Apple users are improved, but the lack of interoperability causes rifts between these users and those of other platforms.

Apple's largest competitor in the mobile operating system space, Google's Android, has a proposed solution for this rift: Rich Communication Services (RCS). RCS is co-governed by a consortium of mobile service operators via the Global System for Mobile Communications Association, made up of approximately 750 member operators. As of 2022, Apple had no plans to adopt RCS, but regulation from the Chinese Ministry of Industry and Information Technology that would require adoption was proposed in 2023 (Gruber, 2024). Google's support of RCS, and Apple's choice to avoid it until regulatory bodies stepped in, is interesting from an economic and sociological standpoint. Especially in the discussion of platforms and protocols, what motivates Apple's exclusionary policies around its iMessage platform? Why did Google pursue support of an open standard, rather than its own closed platform? What are the consequences of such regulation forcing adoption of standards like RCS? Why is regulation required in this instance, when other protocols are adopted readily?

One answer lies around market dominance. Apple's ecosystem is known for its interoperability with other Apple devices, while they don't tend to play nice with devices outside its brand. This makes Apple products sticky, and prevents users from leaving the ecosystem. Apple employees have been quoted on several occasions on their refusals, stating that building an Android app for iMessage "would hurt us more than help us" (Dailey, 2021). Google's attempts at a rival messaging platform have been met with little success, leading it to adopt the RCS standard and push Apple to do the same (Malik, 2022). Scholarly research on this topic is sparse, and Apple's competitive strategy around platform exclusivity would constitute its own research project. The results are clear however, that when a profit-focused firm is in charge of a platform, their actions aren't motivated by what's best for the consumer, but by what keeps them consuming. This is contrasted by groups like the ETSI or GSMA, where the governing bodies of these communication protocols make decisions motivated beyond profit.

HTTP and the World Wide Web

The HyperText Transfer Protocol (HTTP) is one of the most ubiquitous communication protocols in use today; it defines the client-server interaction at the heart of browsing the web and the internet. This section examines the early history of the Web, and the initiatives that were competing to be the way we communicated with it. Why did the open web win out? Why do we use these protocols today? Who made them?

The story of the early internet spans the latter half of the 20th century. Experimentation with networking protocols allowed computers to talk to each other, and by using TCP/IP as a transport layer, protocols for sharing hypertext (literally text with hyperlinks to more text, eventually subsumed by hypermedia) emerged. One of HTTP's early competitors was developed out of the University of Minnesota, termed Gopher. While Gopher had its perks, like "avoiding the complexities of HTML" (Berners-Lee, 1996), it quickly fell out of favor (Lee, 1999) after its developers announced licensing fees for its use (Gihring, 2016). This was mid-April in 1993 (Riddle, 1993); by the end of that month, CERN released its software for the World Wide Web into the public domain (Hoogland & Weber, 1993). As a result, Gopher servers today are counted in the hundreds ("Gopher (Protocol) | Server Census," 2024) - a stark comparison to the proliferation of the web.

The software we use to communicate over the internet is only part of the equation - how do all these computers get connected to one another? The answer lies in ISPs; today, you pay a monthly bill, and you receive a connection to the WWW. But in the 90s, this landscape had a different story. Dominated by H&R Block's CompuServe, the Sears/CBS/IBM joint venture Prodigy, and General Electric's GENie, with AOL lingering behind, the market of Internet Service Providers was not nearly as hands-off as it is today. While these service providers connected home computers to a network, their strategies revolved around selling content rather than connection. AOL managed to pull ahead by recognizing the value of these networks was social,

but still attempted to manage its captive audience within a walled garden (Wu, 2016). In the end, the development of web browsers in combination with the allure of the open web won out; only AOL remains, albeit in a significantly reduced fashion.

Today's internet runs on relatively permissive service providers and open software, but this wasn't always the case. In each dimension, more commercial alternatives vied for attention and even had first-mover advantage. Yet, open protocols and ISPs that gave access to the open web won out. The question remains for further research, why is this the case? Is it something specific to the internet itself, or is there an explanation that can apply to the other platforms discussed in this paper? Is this an anomaly of economics, or an inevitable course that the disaggregation of the firm and platforms will follow?

Blockchain Protocols

After the 2008 financial crisis, a few technological pieces clicked into place, leading to the pseudonymous Satoshi Nakamoto releasing the Bitcoin Whitepaper (2009). This was not a piece of software, nor a platform users could flock to. It was simply an idea and an outline of a protocol that would be implemented and grow into a commodity with a market capitalization of over a trillion dollars. Blockchains as a technology allow for a sort of distributed, immutable ledger, which among other features, enabled Nakamoto's dream of a peer-to-peer currency, with no bank authority in the middle. Shortly after, the release of the Bitcoin whitepaper, development commenced on another blockchain, Ethereum, which added turing-complete computation abilities onto the blockchain. In other words, the internet computer, or "money legos". This has enabled the programmatic reimplementation of various financial instruments, from automated market makers to options contracts.

The technical details of blockchains and cryptocurrency have been covered elsewhere and are beyond the scope of this paper, but they deserve mention in the conversation around platforms and protocols, as the protocols du jour. What sets blockchains apart from other

protocols is their built-in incentive systems, termed "tokenomics", which put in place a programmatic federal reserve for the native currency of the blockchain (Krishnakumar, 2023). These mechanisms enable various actors to align interests, and have created the industry we know today, without a central organization running the servers. The novel economics of these protocols have shifted value accrual from platforms on "Web 2" to the protocols (Monegro, 2016). While Bitcoin has not overtaken the banking industry, cryptocurrency has produced a significant number of interesting socio-economic phenomena, from the running of the blockchain itself to protocol development to DAOs.

Microblogging: Twitter and Bluesky

Twitter is a microblogging platform that likens itself to a "digital town square" (Yeung, 2023), and is operated by a private company. It was publicly traded until it was bought by Elon Musk in October of 2022, which has resulted in a tumultuous year for the platform. Mastodon is an alternative platform stewarded by a recently-incorporated 501c3 that runs on ActivityPub, a protocol governed by the W3C (Webber, 2018). Bluesky is another alternative that was originally incubated within Twitter under Jack Dorsey, and has since spun off into its own public-benefit corporation. This section examines the differences, motivations, and governance of each platform.

Twitter, while not as large as tech giants like Facebook, enjoys a central role in the internet today with over 600 million monthly users around the world (Statista, 2024). Its takeover by Musk has sparked controversy, even occupying its own Wikipedia page ("Twitter under Elon Musk," 2024). This event and actions by Musk since his acquisition of Twitter have provided a clarifying example of the dangers of firm-operated platforms. Policy changes like restricting API usage or haphazard content moderation policies have had significant consequences for users' safety and developers' livelihoods (Mehta, 2023). There are significant risks to entrusting a "cornerstone of civic life" to the hands of a firm (Kleppman et al. 2024).

This is a sentiment shared by the founder of Twitter, Jack Dorsey, and led to the incubation of a decentralized version of the platform (Dorsey, 2019). Despite the existence of other protocols like ActivityPub (for an overview, see Kleppmann et al. 2024), a small team authored the Authenticated Transfer Protocol (ATProto) with user authentication and composability as first-order considerations. Growing to over 5.5 million users after just over a year of operation, the team behind Bluesky and ATProto have made a number of interesting design decisions, from their incorporation as a public benefit corporation (Graber, 2022) to algorithmic choice and custom moderation. The architecture allows for multiple composable pieces, reducing the burden of decentralization and allowing for more developers to contribute to various aspects of the ecosystem. Bluesky is still in its early stages, and while a number of improvements seem to have been made over its centralized comparison, it remains to be seen the future directions the company will take and the success it will have.

Uber and Ridesharing

Uber is the focus of several publications on platforms and the gig economy (Kornberger et al. 2017; Mishel, 2018; Aloisi, 2020; Vallas & Schor, 2020; Peck & Phillips 2021; Kirchner et al. 2022). As of writing, there are several competitors - most notably Lyft, but also taxi companies and differently structured ventures like the Drivers' Cooperative. There is not yet a comparable protocol for the ridesharing industry, unlike messaging, internet communication, transactions, or social media use cases as discussed in the previous sections. While platforms like Uber, Airbnb, TaskRabbit and others have revolutionized service markets, concerns have been raised over their treatment of workers (Shestakofsky & Kelkar, 2020). These companies serve shareholders, and after over a decade in service, Uber only turned a profit in 2023 (Hawkins, 2024). Enshittification as described by Doctorow (2023) is underway, where the companies that exist to mediate the exchanges of users and gig workers extract as much value as they can get away with. While the other provided examples include protocols alongside

existing platforms, no such protocol exists in wide usage to compete with these gig platforms. This section instead will outline such a hypothetical protocol in order to demonstrate its benefits.

Such a protocol might take heavy inspiration from Bluesky's strategy in an attempt to supplant a dominant firm in its market space. A protocol that defines the required featureset, from requesting and accepting rides to payment to verification and user safety, could be developed in a modular fashion, in similar ways to Bluesky's design (Kleppman et al. 2024). Rather than entrusting app development, algorithm development (including pricing), and trust and safety mechanisms with one firm, these could be parceled out. Such a protocol could be designed with stakeholders from taxi unions and city councils as well, in order to avoid debacles like the protests incurred by the expansion of Uber and Lyft in various cities, overtaking the embedded taxi drivers. Such an open design would lead to a race to the bottom in the pricing by service providers, while a much more "free market" would exist between riders and drivers. The interoperability of driver and rider apps would re-encourage competition to win these users over, since a driver could simply drive for a company that paid them better, and a user use the app that charged them the least. This would also lower the barrier of entry for new apps, allowing them to access the existing networks of riders and drivers, and if the protocol were to adopt the composable nature of ATPProto, reducing the complexity required to make useful contributions to the ecosystem.

While this has clear opportunities for consumer benefit, the main question is how to get such a project off the ground. Bluesky had the benefit of a Twitter CEO that happened to fund the initiative, while early internet protocols are the product of working groups and research institutions. Current platforms certainly wouldn't stand to benefit from opening their doors, as shown by Apple's hesitancy, and researchers don't stand to benefit in the same way as they did from the protocols of the world wide web. Even if such a protocol were developed and usable, what motivation is there for Uber or Lyft to adopt it, outside of regulatory pressure as we see in Apple's case with RCS? While hosting social media servers does have its own costs, running

the infrastructure for global ridesharing intermediation has significantly higher costs, from payment processing to a legal department and customer service. Would there need to be built-in economic incentives inspired by blockchains? How would the economics of operating the servers and adjacent services work? These are the questions that stand between riders, drivers, and a protocolized ridesharing experience.

Conclusion

Platforms and protocols represent competing visions for the future of organization. They both find purpose in facilitating exchange and communication, but differ in their approach. While platforms have the benefits of capital and profit-driven economics on their side, they also have their drawbacks and have attracted scrutiny. Protocols, alternatively, eliminate the scarcity of the benefits they provide, allowing for universal adoption and adaptation, while simultaneously removing any immediate economic incentive for the labor required to implement them. This paper has outlined an overview of organizational theory background, offered a comparison of these two economic forms, and provided several examples for consideration. Protocols remain under-studied as an economic form, and future research should explore the technical, social, and economic conditions surrounding their origin, development, and sustainability. Platforms have evolved quickly due to the economic advantages they provide, but skepticism of their longevity points toward the necessity of alternatives. Protocols must continue to be explored, as there is much to uncover toward a sustainable, interoperable, and transparent digital economy in the information age.

References

- Agnew, J.-C. (1986). *Worlds Apart: The Market and the Theater in Anglo-American Thought, 1550–1750*. Cambridge University Press. <https://doi.org/10.1017/CBO9780511571404>
- Aloisi, A. (2020). *Hierarchies without firms? Vertical disintegration, outsourcing and the nature of the platform* (SSRN Scholarly Paper 3124389). <https://doi.org/10.2139/ssrn.3124389>
- Aubry, H. (2024, April 25). *Open Source Programs with Hannah Aubry, Fastly at KubeCon EU 2024* (E. Vielmetti, Interviewer) [Youtube]. <https://www.youtube.com/>
- Ballon, I. C. (2019). Liability of Platforms. In *E-Commerce and Internet Law: Legal Treatise with Forms 2d Edition* (2nd ed.). Thomson/West Publishing.
- BCB Group. (2022, October 4). *What Does Trustless Mean in Crypto?* <https://www.bcbgroup.com/what-does-trustless-mean-in-crypto/>
- Benkler, Y. (2002). Coase's Penguin, or, Linux and "The Nature of the Firm." *The Yale Law Journal*, 112(3), 369–446. <https://doi.org/10.2307/1562247>
- Berners-Lee, T. (1996). The World Wide Web: Past, Present and Future. *IEEE Computer, Special Issue October 1996 (Abandoned)*. <https://www.w3.org/People/Berners-Lee/1996/ppf.html>
- Cañada, E., Izcara, C., & Zapata Campos, M. J. (2023). Putting Fairness into the Gig Economy: Delivery Cooperatives as Alternatives to Corporate Platforms. *Societies*, 13(3), 68. <https://doi.org/10.3390/soc13030068>
- CERN. (1993). *Software release of WWW into public domain*. <https://cds.cern.ch/record/1164399>
- Coase, R. H. (1937). The Nature of the Firm. *Economica*, 4(16), 386–405. <https://doi.org/10.1111/j.1468-0335.1937.tb00002.x>

Communication protocol. (2024). In *Wikipedia*.

https://en.wikipedia.org/w/index.php?title=Communication_protocol&oldid=1216161760#cite_note-1

Dailey, N. (2021, April 9). *Apple said bringing iMessage to Android would “hurt us more than help us.”* Business Insider.

<https://www.businessinsider.com/apple-imessage-on-android-would-hurt-more-than-help-2021-4>

Davis, G. F. (2016). Can an Economy Survive Without Corporations? Technology and Robust Organizational Alternatives. *Academy of Management Perspectives*, 30(2), 129–140.

<https://doi.org/10.5465/amp.2015.0067>

Demil, B., & Lecocq, X. (2006). Neither Market nor Hierarchy nor Network: The Emergence of Bazaar Governance. *Organization Studies*, 27(10), 1447–1466.

<https://doi.org/10.1177/0170840606067250>

Demil, B., Lecocq, X., & Warnier, V. (2013). The Capabilities of bazaar governance:

Investigating the advantages of business models based on open communities. *The Business Model Community Working Paper Series*.

https://d1wqtxts1xzle7.cloudfront.net/110769284/bpmyo-BM_Community_WP_11-libre.pdf?1706039905=&response-content-disposition=inline%3B+filename%3DThe_Capabilities_of_bazaar_governance_in.pdf&Expires=1714346347&Signature=bzH2mq2dmYo-3ebcVjolVoWwSyV~SqH4Rw4kKo52xn~sGdMUvapfXreJLn1fWzGIO1C40SleOt-0wIUExgXMR8A3JsMX8k1aC~rkPi2~9iUUdQ1u211nMtF0MSSbo3~tbWeZTvh0fkuNBoz6nYcJMIjy6qWioToMlw aPHk7s9YqBe9nJ9qmpIRgR6XOkURvlgm~OAIGYhwbE2YUI7OAgCYxVPCpkeBeD~MLcITlJTCQZbRGJ~t6Uwreu5eQMjVkfzaDvTQos7BwkasFz03h-hoQAqPV4E~UMBAGisTkFF1BkRJ2~GEXs-W~TKBz~BdArwK0KkCeOqW45cCChMkVuw_&Key-Pair-Id=APKAJLOHF5GGSLRBV4ZA

Doctorow. (2023, January 27). *Pluralistic: Tiktok's enshittification (21 Jan 2023) – Pluralistic:*

Daily links from Cory Doctorow. <https://pluralistic.net/2023/01/21/potemkin-ai/>

Dorsey, J. (2019, December 11). *Twitter is funding a small independent team of up to five open source architects, engineers, and designers to develop an open and decentralized standard for social media. The goal is for Twitter to ultimately be a client of this standard.* 📱 [Tweet].

Twitter. <https://twitter.com/jack/status/1204766078468911106>

Dvorsky, M. (2022, February 10). Text bubble bullies: The latest in cyberbullying. *Rise and Shine by Children's National.*

<https://riseandshine.childrensnational.org/text-bubble-bullies-the-latest-in-cyberbullying/>

Ethereum Foundation. (n.d.). Ethereum.Org. Retrieved May 5, 2024, from

<https://ethereum.org/en/foundation/>

Flanagan, H. (2019). *Fifty Years of RFCs* (Request for Comments RFC 8700). Internet

Engineering Task Force. <https://doi.org/10.17487/RFC8700>

Gihring, T. (2016, August 11). The rise and fall of the Gopher protocol. *MinnPost.*

<http://www.minnpost.com/business/2016/08/rise-and-fall-gopher-protocol/>

Gopher (protocol) | Server census. (2024). In *Wikipedia.*

[https://en.wikipedia.org/w/index.php?title=Gopher_\(protocol\)&oldid=1222223778#Server_census](https://en.wikipedia.org/w/index.php?title=Gopher_(protocol)&oldid=1222223778#Server_census)

Graber, J. (2022, February 7). *Announcing Bluesky PBLLC.* Bluesky.

<https://bsky.social/about/blog/2-7-2022-overview>

Graeber, D. (2011). *Debt: The First 5,000 Years* (First Melville House pbk). MELVILLE HOUSE.

Gruber, J. (2024, February 16). The European Commission Had Nothing to Do With Apple's

Reversal on Supporting RCS. *Daring Fireball.*

https://daringfireball.net/2024/02/eu_rcs_imessage

Hawkins, A. J. (2024, February 8). Uber ends the year in the black for the first time ever. *The Verge*.

<https://www.theverge.com/2024/2/8/24065999/uber-earnings-profitable-year-net-income>

Hoogland, W., & Weber, H. (1993). *Software release of WWW into public domain*.

<https://cds.cern.ch/record/1164399>

Kamien, M., & Schwartz, N. (1975). Market Structure and Innovation: A Survey. *Journal of Economic Literature*.

<https://www.semanticscholar.org/paper/Market-Structure-and-Innovation%3A-A-Survey-Kamien-Schwartz/bee2506b8e5e8fd9eac53e248df9162e49e39345>

Kirchner, S., Dittmar, N., & Ziegler, E. S. (2022). Moving Beyond Uber: Two Modes of Organization and Work in the German Platform Economy. *KZfSS Kölner Zeitschrift Für Soziologie Und Sozialpsychologie*, 74(S1), 109–131.

<https://doi.org/10.1007/s11577-022-00830-x>

Kleppmann, M., Frazee, P., Gold, J., Graber, J., Holmgren, D., Ivy, D., Johnson, J., Newbold, B., & Volpert, J. (2024). *Bluesky and the AT Protocol: Usable Decentralized Social Media* (arXiv:2402.03239). arXiv. <http://arxiv.org/abs/2402.03239>

Kornberger, M., Pflueger, D., & Mouritsen, J. (2017). Evaluative infrastructures: Accounting for platform organization. *Accounting, Organizations and Society*, 60(C), 79–95.

Krishnakumar, A. (2023, March 22). *Ethereum as a deflationary asset, explained*. Cointelegraph.

<https://cointelegraph.com/explained/ethereum-as-a-deflationary-asset-explained>

Lee, C. (1999, April). *Where Have all the Gophers Gone? Why the Web beat Gopher in the Battle for Protocol Mind Share*. https://ils.unc.edu/callee/gopherpaper.htm#berners_aug

Malik, A. (2022, August 9). Google's new campaign attempts to publicly pressure Apple into adopting RCS. *TechCrunch*.

<https://techcrunch.com/2022/08/09/google-new-campaign-pressure-apple-adopting-rcs/>

Malloy, B. A., & Power, J. F. (2019). An empirical analysis of the transition from Python 2 to Python 3. *Empirical Software Engineering*, 24(2), 751–778.

<https://doi.org/10.1007/s10664-018-9637-2>

Markus, M. L. (2007). The governance of free/open source software projects: Monolithic, multidimensional, or configurational? *Journal of Management & Governance*, 11(2), 151–163. <https://doi.org/10.1007/s10997-007-9021-x>

Masnick, M. (2019, August 21). *Protocols, Not Platforms: A Technological Approach to Free Speech*.

<http://knightcolumbia.org/content/protocols-not-platforms-a-technological-approach-to-free-speech>

Maultzsch, F. (2018). Contractual Liability of Online Platform Operators: European Proposals and established Principles. *European Review of Contract Law*, 14(3), 209–240.

<https://doi.org/10.1515/ercl-2018-1013>

Mehta, I. (2023, February 14). Twitter’s restrictive API may leave researchers out in the cold. *TechCrunch*.

<https://techcrunch.com/2023/02/14/twitters-restrictive-api-may-leave-researchers-out-in-the-cold/>

Meta Llama. (n.d.). Meta Llama. Retrieved May 5, 2024, from <https://llama.meta.com/#>

Mishel, L. (2018, May 15). *Uber and the labor market: Uber drivers’ compensation, wages, and the scale of Uber and the gig economy*. Economic Policy Institute.

<https://www.epi.org/publication/uber-and-the-labor-market-uber-drivers-compensation-wages-and-the-scale-of-uber-and-the-gig-economy/>

Monegro, J. (2016, August 8). Fat Protocols. *Union Square Ventures*.

<https://www.usv.com/writing/2016/08/fat-protocols/>

- Moyal, A., Tan, J. C. Y., & Halevy, N. (2023). Brokering in hierarchies versus networks: How organizational structure shapes social relations. *Journal of Experimental Social Psychology*, 109, 104515. <https://doi.org/10.1016/j.jesp.2023.104515>
- Nakamoto, S. (2009). *Bitcoin: A Peer-to-Peer Electronic Cash System*.
- National Conference of Commissioners on Uniform State Laws. (n.d.). *HeinOnline*. Retrieved May 5, 2024, from <https://home.heinonline.org/content/national-conference-of-commissioners-on-uniform-state-laws/>
- O'Neil, M., Muselli, L., Raissi, M., & Zacchiroli, S. (2021). 'Open source has won and lost the war': Legitimising commercial–communal hybridisation in a FOSS project. *New Media & Society*, 23(5), 1157–1180. <https://doi.org/10.1177/1461444820907022>
- Papastergiou, G., Fairhurst, G., Ros, D., Brunstrom, A., Grinnemo, K.-J., Hurtig, P., Khademi, N., Tüxen, M., Welzl, M., Damjanovic, D., & Mangiante, S. (2017). De-Ossifying the Internet Transport Layer: A Survey and Future Perspectives. *IEEE Communications Surveys & Tutorials*, 19(1), 619–639. <https://doi.org/10.1109/COMST.2016.2626780>
- Peck, J., & Phillips, R. (2021). The Platform Conjuncture. *Sociologica*, 73-99 Pages. <https://doi.org/10.6092/ISSN.1971-8853/11613>
- Pierce, D. (2023, December 10). *Apple responds to the Beeper iMessage saga: 'We took steps to protect our users.'* The Verge. <https://www.theverge.com/2023/12/9/23995150/beeper-imessage-android-apple-statement>
- Postel, J. (1979). *Internet Meeting Notes—10, 11, 12 & 13 September 1979*. ISI. <https://www.rfc-editor.org/ien/ien121.txt>
- Potts, J., Torrance, A., Harhoff, D., & Von Hippel, E. (2024). Profiting from Data Commons: Theory, Evidence, and Strategy Implications. *Strategy Science*, 9(1), 1–17. <https://doi.org/10.1287/stsc.2021.0080>

Powell, W. W. (1990). Neither Market nor Hierarchy: Network Forms of Organization. In *Research in organizational behaviour: An annual series of analytical essays and critical reviews*. (Vol. 12, pp. 295–336). JAI Press.

https://web.stanford.edu/~woody/powell_neither.pdf

Protocol | Definition, Examples, & Facts | Britannica. (2024, March 8).

<https://www.britannica.com/technology/protocol-computer-science>

Rao, V., Beiko, T., Ryan, D., Stark, J., Van Epps, T., & Aue, B. (2023, March 9). *The Unreasonable Sufficiency of Protocols | Summer of Protocols* [Gitbook].

<https://venkatesh-rao.gitbook.io/summer-of-protocols/>

Riddle, P. (1993, April 12). *Trip report: 1993 GopherCon*.

<http://prentissriddle.com/trips/gophercon1993.html>

Schor, J. (2014, October). Debating the Sharing Economy. *Great Transition Initiative*.

<https://greattransition.org/publication/debating-the-sharing-economy>

SEC Files Subpoena Enforcement Action Against Terraform Labs and Its CEO. (2021, November 12). SEC.Gov. <https://www.sec.gov/litigation/litreleases/lr-25262>

Shestakofsky, B., & Kelkar, S. (2020). Making platforms work: Relationship labor and the management of publics. *Theory and Society*, 49(5–6), 863–896.

<https://doi.org/10.1007/s11186-020-09407-z>

SMS. (2024). In *Wikipedia*.

https://en.wikipedia.org/w/index.php?title=SMS&oldid=1222338658#cite_note-itu-36

Srnicek, N., & De Sutter, L. (2017). *Platform capitalism*. Polity.

Statista. (2024, April). *Biggest social media platforms 2024*. Statista.

<https://www.statista.com/statistics/272014/global-social-networks-ranked-by-number-of-users/>

Twitter under Elon Musk. (2024). In *Wikipedia*.

https://en.wikipedia.org/w/index.php?title=Twitter_under_Elon_Musk&oldid=1220359731#References

Vallas, S., & Schor, J. B. (2020). What Do Platforms Do? Understanding the Gig Economy.

Annual Review of Sociology, 46(1), 273–294.

<https://doi.org/10.1146/annurev-soc-121919-054857>

Wang, J., Guo, B., Wang, X., & Lou, S. (2020). Closed or open platform? The nature of platform and a qualitative comparative analysis of the performance effect of platform openness.

Electronic Commerce Research and Applications, 44, 101007.

<https://doi.org/10.1016/j.elerap.2020.101007>

Webber, C. L. (2018, March 20). *ActivityPub reaches W3C Recommendation status! Everybody party! —ActivityPub Rocks!*

<https://activitypub.rocks/news/activitypub-reaches-w3c-recommendation.html>

Williamson, O. E. (1976). The Economics of Internal Organization: Exit and Voice in Relation to Markets and Hierarchies. *The American Economic Review*, 66(2), 369–377.

Wood, A., & Lehdonvirta, V. (2021, April 7). *Antagonism beyond employment: How the ‘subordinated agency’ of labour platforms generates conflict in the remote gig economy.*

<https://doi.org/10.31235/osf.io/y943w>

Wu, T. (2016). *The attention merchants: The epic scramble to get inside our heads* (First edition). Alfred A. Knopf.

Yeung, D. (2023). *The “Digital Town Square” Problem.*

<https://www.rand.org/pubs/commentary/2023/01/the-digital-town-square-problem.html>