




Beyond Uberization: The co-constitution of technology and organizing

Organization Theory
Volume 2: 1–14
© The Author(s) 2021
Article reuse guidelines:
sagepub.com/journals-permissions
DOI: 10.1177/2631787721995205
journals.sagepub.com/home/ott


Samer Faraj¹ and Stella Pachidi² 

Abstract

Uberization has emerged as a platform-based form of organizing that is reshaping work and labour markets and that is fundamentally challenging existing thinking on organizing. We suggest that organizational theorists have been reluctant to address the constitutive relation between technology and organizing. By emphasizing co-constitution, we argue against viewing technology as an entity that is separate, exogenous, or causal. Instead, we offer that technology can be fruitfully viewed as endogenous to and constitutively entwined with organizational actions and structures. To illustrate this co-constitution, we present a brief analysis of Uberization from a regime of organizing perspective that emphasizes how organizing practices, valuation schemes, authority arrangements and technological arrangements are entwined with each other. We conclude with an invitation to organizational theorists to more specifically engage with technology as they theorize new forms of organizing.

Keywords

contingency theory, information systems, innovation, organizational form, science and technology studies (STS), technology

On November 4th, 2020 while the United States awoke to a national election too close to call, euphoria reigned at the headquarters of Uber, Lyft, and DoorDash for their Proposition 22 had been approved by California voters. For a mere \$202 million investment in the campaign, these ridehailing companies saw their market valuation instantly go up by \$10 billion. More important,

¹McGill University, Montreal, QC, Canada

²University of Cambridge, Cambridge, UK

Corresponding author:

Samer Faraj, McGill University, Bronfman Bldg, Montreal H3A 1G5, Quebec, Canada.

Email: samer.faraj@mcgill.ca



they were now free from the constraints of labour law and from the threat of having to provide drivers with a minimum wage, sick days and unemployment benefits. As the business press was quick to recognize: ‘the ride-hailing leaders and other gig companies bought themselves immunity from California’s employment reform with a model they may be able to export around the country’ (Eidelson, 2020).

In a few short years, the technology platform model at the core of the digital economy has gained extraordinary strength, offering organizing mechanisms that are transforming increasingly larger sectors of the economy. A handful of platform companies have reached market dominance in sectors as diverse as online search (Google), social networking (Facebook) and online retail (Amazon). By the end of the current decade, such firms are projected to continue growing as to reach 30 percent of the world’s gross economic output (US Congress, 2020). As waves of new technological developments, e.g. AI (artificial intelligence), facial recognition, robotics, autonomous vehicles, 3D printing, blockchain and the Internet of things, are unfolding, it is high time to consider how these developments challenge the field’s bedrock beliefs about organizations and organizing. Specifically, organizational theorists need to seriously engage with the brave new world of technology-entwined organizing, and to do so, requires a direct (re)consideration of the role of technology in organizing.

This short essay takes the paper by Davis and Sinha (2021) in this issue of the journal as its starting point. In their essay, these authors focus on ‘Uberization’ as a platform-based form of organizing that is reshaping work and labour markets and that fundamentally challenges existing forms of organizing. By comparing how Uberization has taken place in seven countries, the authors inform the debate on technology and organizing. They stress the importance of institutional, economic and political factors in shaping the local version of ridesharing in each context. While the Davis and Sinha study empirically focuses on Uber, the findings are generative for scholars interested in the broader phenomenon

of the emergent organizational forms that are tightly entwined with technology.

We welcome the debate on the relation between technology and organizing. We prioritize the term organizing over organization to recognize that we are currently in an era of ferment reflective of what Davis (2016, p. 132) has referred to as ‘a Cambrian explosion of new forms’. The focus on the relation between technology and organizing aims to revive a core organization theory issue that organizational theorists have largely side-stepped since the heydays of contingency theory¹ (e.g. Perrow, 1984; Thompson, 1967). In the balance of this article, we review how organization theory, particularly the contingency and design strand, has conceptualized technology. We find that the field has either avoided technology, or alternatively, blackboxed it and reduced it to an external force to be exploited and deployed as a source of innovation.

The essence of our argument is that viewing organizational structure as principally a social arrangement while treating technology as an exogenous force (or entity giving rise to capabilities or organizing possibilities) is limiting. It is more theoretically fruitful to approach technology as endogenously co-constitutive of organizing. By emphasizing co-constitution, we argue against viewing technology as an entity that is separate, exogenous, or causal. Instead, we offer that technology needs to be viewed as endogenous to and constitutively entwined with organizational actions and structures. To illustrate this co-constitution, we present a brief analysis of Uberization from a regime of organizing perspective that emphasizes how organizing practices, valuation schemes, authority arrangements and technological arrangements are entwined with each other. Approaches such as the regime of organizing may be fruitful for scholars interested in a non-dualistic and relational exploration of the technology and organizing nexus.

How Organization Theory Addresses Technology

Since Marx and Schumpeter, organizational scholars have acknowledged that technological

advances play a prominent role in shaping organizations and organizing. Marx launched the modern debate with his aphorism – frequently misunderstood as deterministic – about how the hand-mill gives you a feudal society while the steam engine gives you industrial capitalism (Marx, 1847/1955). Similarly, Schumpeter (1942) placed technological advances as a central force threatening firms with gales of creative destruction. The idea that technology is an independent force that is reshaping society, and not necessarily toward a better future, has remained surprisingly strong among scholars studying technology (e.g. Ellul, 1954/1964; Heidegger, 1954/1977; Kelly, 2010). More subtle analyses have since de-emphasized direct causality in favour of more social explanations that while recognizing a ‘technological imperative’ emphasize adaptation and the political nature of the process (e.g. Feenberg, 1999; Winner, 1977). Other analyses focused on technology and work have explored how managers mobilize the possibilities offered by technology to systematically automate tasks in ways that reduce worker autonomy (Braverman, 1974; Edwards, 1979; Noble, 1977; Zuboff, 1988). Currently, organizational theorists are only peripherally involved in the growing regulatory, societal, economic and political debates surrounding technology developments such as digital platforms, AI and work, the gig economy, and surveillance capitalism (e.g. Frey, 2019; US Congress, 2020; Woodcock & Graham, 2019; Zuboff, 2019).

Today, technology continues to have a shrinking ontological status in organizational theory and in management research in general. Indeed, a survey of major organizational journals found that a mere 2.8 percent of articles in leading organizational journals addressed the relation between technology and organizational form (Zammuto, Griffith, Majchrzak, Dougherty, & Faraj, 2007). Instead of addressing technology specifically, or dealing with its entanglement with organizational form, many scholars implicitly continue to favour Child’s (1974) quip that the concept of technology has as many senses as there are writers on the topic. Furthermore,

many prefer to bracket the role of technology, viewing it as an enabling force, as they prefer to address the subtleties of emergent forms such as digitization, platforms and Uberization. By focusing on the novelty of these organizational forms, scholars often overlook how technology is constitutively entwined with the new form and often reduce it to a factor to be deployed for competitive advantage. Thus, the field may be in danger of generating a shallower understanding of these forms of organizing and mischaracterize their workings.

How early organizational theorists have addressed technology is illuminating as it exposes a shift in conceptualizing technology, with the organization theory field neglecting the constitutive role of technology in organizing till today. The internal perspective on technology emerged more than half a century ago, when organizational theorists working within the confines of contingency theory found technology to be a fundamental basis for structuring organizations. Thus, the core technology of the firm, alongside the external environment, constituted the pillar of a theory of organizing where technology was the central factor in shaping organizational structure (Lawrence & Lorsch, 1967; Thompson, 1967; Woodward, 1965). Technology (including the social system necessary to ensure production) was central for conceptualizing how an organization transformed inputs into outputs (e.g. Perrow, 1984) or describing the work performed by the organization (Scott & Davis, 2007). From this perspective, a firm’s technology is the source of value and must constantly be protected, tweaked and improved in order to ensure competitive advantage. Early organizational theorists, especially those building on empirical studies of production technologies (e.g. Woodward, 1965), found that organizations tended to develop structures that differed based on the complexity of the core production technology. In turn, Thompson (1967) pointed out that the organization’s production technology needed to be buffered from the vagaries of the environment both on the input and output side and concluded that organizational form was linked to

the need to protect the 'core' from variation in the environment.

Building on this contingency framework, design-oriented organizational theorists have approached technology architecturally, as a variable under the control of designers, to ensure that information is processed appropriately in the organization. Embracing an information processing perspective, and building on the external developments of information and communication technologies from the 1960s onward, the organizing challenge became how to ensure that the information processing capacity of the organization matched the information needs emanating from a task and its uncertainty (e.g. Galbraith, 1973; Nadler & Tushman, 1988). From an information processing perspective, information technology does 'affect both the organization's demand for information processing and its capacity for processing information' (Burton, Obel, & DeSanctis, 2011, p. 6). Technology – especially of the information technology variety – started being considered an essential element of the structure as it facilitated information flows. It allowed managers to deploy technological systems to collect, process, aggregate and process lower-level data faster and more accurately, and to transmit it vertically or laterally. Theoretically, an equifinality argument pacified the debate: a recognition that 'the technology-structure need not imply a single determinant relation' (Scott, 1990, p. 121). Today, while recognizing that technology does not determine organizational structure, modern organizational theorists have embraced technology's essential role in affecting all facets of structure: from providing centralized governance to reinforcing authority arrangements and hierarchy (e.g. Baldwin, 2019).

In recent times, scholars of innovation have also shown an increased interest in technology, conceiving it as the most important driver of competitive success. The priority became to identify sources, patterns and processes of technological innovation, and how to formulate strategies that help manage disruption and nurture innovation projects (e.g. Schilling, 2017; Tushman & Nelson, 1990). Because technological change may disrupt

organizations' ability to create and offer products or services, innovation scholars looked into the factors and processes through which technological change would either enhance organizations' competencies by involving substantial improvements to their existing routines (Anderson & Tushman, 1990), or would put organizations at a disadvantage due to requiring radically new knowledge, competencies and routines (Tripsas, 1997). Across all of these organization theory streams, not only did scholarship shift away from how technology shapes organizations, it instead refocused on the pressing strategy problems of how to act with technology. For example, how to utilize digitization to reshape previously stable industry boundaries, or how to strategically deploy newly developed technologies for competitive advantage. Rather than focusing on technology's impact on organizing, scholars concentrated their attention on the determinants of technological innovation and looked at institutional influences, alliances and issues of appropriability (e.g. Ahuja, Lampert, & Tandon, 2008). In short, the study of technology as it relates to structure has been put aside. As a result, and up until the present, the field of organization theory shifted to the pursuit of how technological innovation can be marshalled for organizational performance.

Reasons Why Organization Theory has Moved Away from Technology

This lack of progress in explaining the link between technology and organizing is not easy to reverse due to four interrelated issues that hinder theoretical progress. First, the importance of technology as a shaper of structure has been challenged by more recent organizational scholars. The earlier focus on technology as a key predictor has been challenged by a number of analyses that offer that organization size may be the essential predictor of organization structure and that hierarchy remains steadfast as the essential organizational form (for a review of such arguments see Donaldson, 2001). While size and the environment remained as the less controversial determinant of structure, 'by the

mid-1990s, technology had virtually died out as a theme in the study of organizational form and function within the organization science literature' (Zammuto et al., 2007, p. 750). Other theories emphasizing power, institutions, human relations or transaction costs moved to the forefront.

A second reason relates to the difficulty of incorporating technology in existing theory. The conceptual problems (e.g. variegated definitions of technology, whether technology's effect is direct or contingent, the overlap between task and technology) are not easily addressable, leading researchers to background technology and foreground other concepts. For instance, Williamson (1988, p. 357) dryly responded to a question about the missing role of technology in transaction cost economics by positioning technology as an exogenous factor: 'technology thus serves to delimit the feasible set, choice within which mainly reflects transaction cost economizing purposes'. Similarly, institutional scholars focus on the novel institutional arrangements critical for digital transformation and examine how these arrangements gain social approval in the eyes of key stakeholders (e.g. Hinings, Gegenhuber, & Greenwood, 2018). Thus, many organizational theorists are faithful to the epistemological criteria of 'inference to the loveliest explanation', and so orient themselves to the explanation that provides theoretical elegance, confirmation of previous frames, or unified understanding (Lipton, 2004). Theoreticians often discard the likeliest explanation for it may appear to be more trivial, direct, and less aligned with paradigmatic assumptions. Most organizational theories (e.g. agency theory, institutional theory, contingency theory, resource dependency etc.) have difficulty addressing the constitutive entanglement of technology in organizing, with attention focused elsewhere – what they consider the 'lovely' matters of social construction, transaction costs, or institutional forces. Thus, technology falls outside the scope of favoured theoretical framings and, no matter how fast technology is transforming society and organization, it does not rise to the level of theoretical loveliness.

Third, there is lack of clarity about the epistemological status of technology: whether to focus on technology per se, or on technological systems; whether to analyse technology at the organizational, departmental or task level (Goodman & Sproull, 1990). If, as has become clear over the last decades, technology is no longer the primary 'shaper' of organizational structure, how should it be approached? One way is to view it as reciprocally engaged with structure since it impacts and transforms existing interaction patterns in unpredictable ways (see Barley, 1986; Orlikowski, 1992). Another way is to see technology in organization as equivocal because it allows multiple interpretations and is subject to misunderstandings: 'it either confirms ingrained interaction patterns or disturbs and reformulates them' (Weick, 1990, p. 19). Similarly, ontological questions abound: is technology 'out there' in the world, in the sense of a realist ontology; or is it socially constructed, in the sense of its use being dependent on the social, political and meaning assigned to it by individuals and groups? This question fuels the sociomateriality of technology debate with contention around the locus of material vs. social agency (e.g. Leonardi & Barley, 2010; Orlikowski, 2010). Does technology exist independently from organizational use or is it enacted in practice by organizational actors that are keen on resisting and interpreting what the technology affords? (see Boudreau & Robey, 2005; Leonardi, 2013; Pachidi, Berends, Faraj, & Huysman, 2020; Zammuto et al., 2007).

Fourth, a further reason for the reluctance of organization theory scholars to engage with technology is the prevailing fear about falling prey to deterministic thinking about technology. Most scholars refuse to accord agency to technology as a social force that directly refashions political, social, economic, or organizational forms. As social scientists, they look at the effect of technological systems on organizing. Thinking of technology as a controllable and malleable tool strengthens the perception that technology falls under 'managerial choice' and avoids the issue of technology's agency by focusing on complex social, economic and

institutional explanations (e.g. Child, 1972). Outside management, the debate on whether technology has a deterministic effect on social structures remains unsettled. For historians of technology, an important insight is related to the level of analysis. At the macro level, evidence points to the importance of technological change in bringing about societal change, while at the micro level it supports a messier, more contingent social construction explanation (Misa, 1994). For organizational scholars operating at the meso level, the theoretical challenge is to develop theory that does not just pick one of the poles: either that technology plays an independent and causal influence on organizations, or that it is primarily adaptable, shaped by social processes and controlled by powerful organizational actors. While this debate may appear historic, it re-emerges whenever the pace of technological change increases or when novel technologies come to the fore (see Bodrožić & Adler, 2018; Davis, 2016; Orlikowski, 1992).

In sum, most organizational theorists have chosen to view technology through the prism of social construction that only recognizes technology as a factor affecting organizing possibilities (e.g. Boudreau & Robey, 2005; Williamson, 1988), conveniently emphasizing managerial choice in terms of ‘deploying technology to improve efficiency and effectiveness’ (Daft, 2009, p. 20).

We suggest that this preference for an explanation, concordant with existing theoretical preferences, that views (information) technology primarily as a design element for structure and refuses to engage with the idea that technology is a force whose impact and development trajectory may not be reducible to ‘managerial choice’, is hindering the increasingly necessary understanding of what technology does. The weight of the evidence, at least in this era of technological ferment driven by digitization, points rather to the likelier explanation that technology plays a formative and increasingly crucial role in both undergirding and transforming organizing. It is our contention that while much effort has been expended in developing a substantivist definition of technology, studying

it as a factor and force in and of itself, such efforts are less fruitful because they miss the crucial co-constitution of technology and organizing. Simply, technology is inseparable from organizing. It is via the actions and structuring possibilities that its presence affords that technology takes form.

Addressing Novel Forms of Organizing

Today, the question in front of us is not whether, but how, technology needs to play a more pivotal role in our theories of organizing. As Davis and Sinha (2021) remind us, the urgency stems from being in an era of Cambrian-like explosion in new organizational forms. Beyond the well-recognized limitation of determinist theorizing exemplified by simplistic quips about the printing press causing the reformation or the steam engine causing capitalism, it may be time to revisit where technology fits in our theorizing of organizations. The challenge, ironically, takes the form of a back-to-the-future moment: for we have discarded technology as the core shaper of organizational structure, and embraced technology as an external cornucopia of technological possibilities that managers select from to design innovative organizations that disrupt markets, respond to competitors, or simply improve efficiency and effectiveness. Are we ready to rethink how technology is addressed in organization theories? Without falling back into simplistic deterministic thinking, can we develop theories of co-constitution of technology with the core processes and structures of the organization?

Early in the twentieth century, the bureaucratic form of organizing was married to the production technology of the assembly line to give us Fordism. It was, and as many contend, remains the most efficient form of organizing, at least when tasks can be programmed or routinized (e.g. Perrow, 1984). The essence of Fordism can be found in the Tayloristic focus on the breaking down of tasks into simpler ones, the reliance on standardized parts and the employment of assembly lines to speed up manufacturing. Fordism ‘worked’ because it was

compatible with hierarchy and the deployed technology provided greater control for employers. Employers spelled out exactly what duties were expected and competition among job applicants for the typically higher pay made them docile (see Edwards, 1979).

Another form of organizing that emerged in the late twentieth century was that of globalization.² Advances in information and communication technologies (e.g. the Internet, mobile phones), dropping costs of transport (container ships, air transport) and reduced trade barriers made it advantageous for companies to move productions nearer to resources and cheap labour sources. As we rush to understand globalization from the perspective of the movement of people, capital, markets and governance, little attention is paid to the role of technology in bringing about and sustaining the process. Yet, nine out of ten identified ‘flatteners’ that gave rise to globalization were technological in nature (see Friedman, 2005). Another descriptive label that sociologists have deployed is that of McDonaldisation where products and services worldwide can be rendered in an unprecedented homogeneous and efficient form due to ‘an increase in efficiency, predictability, calculability and control through the substitution of non-human for human technology’ (Ritzer, 1998, p. viii).

A quarter century ago, organizations were buffeted by the emergence of the Internet and strategists worried about ‘disintermediation’ and being ‘Amazoned’. Now, as most processes become digitized, large technology platforms, such as Amazon, Google, Facebook and Apple, are gaining economic ascendance (Parker, Van Alstyne, & Choudary, 2016). Powered by digital processes, the platform connects parties (such as consumers and producers) to conduct interactions (including economic transactions) that are mediated in ways that greatly benefit the platform owners. The essence of the current digital era seems to be that ‘data is the new oil’ and that prediction algorithms represent a qualitative leap in how firms gain advantage by reducing environmental uncertainty (Agrawal, Gans, & Goldfarb, 2019). Others see AI-driven

processes as the operating core that allows firms to develop technology-based business models that break industry boundaries, allow unheard-of learning opportunities and offer hard-to-fathom advantages (Iansiti & Lakhani, 2020). In all the excitement about the possibilities offered by the technology *du jour*, it is difficult not to see deterministic thinking in the formulation of ‘adopting technology X leads to competitive advantage’. To make those claims, most authors fall back on an intermediate vocabulary of business models, strategic disruption, opportunity seizure, artful execution, etc. but the essential agency is that of technology changing organizations.

From a cursory review of technological change since the industrial revolution, a pattern does become clear: when the underlying technology evolves and new potentialities for organizing are made possible, organizational theorists struggle with explaining the change. Contingency theory may have given up on a simplistic causal relation between technology and structure, and has repositioned technology as part of the external environment (see Donaldson, 2001, for a modern restatement). Information processing theory has lost some of its explanatory power as digitization now allows almost universal access to needed information anywhere in the organization. For transaction cost and agency scholars, technological change affects the cost of interaction and monitoring but does not enter directly into the theory. Similarly, favoured explanations related to logics, isomorphic pressures, identity and legitimacy continue to be the main preoccupation of institutional scholars. Finally, organizational design scholars, while recognizing the importance of technological change, prefer to explain new forms of organizing as arising from the teleological deployment of micro-structures that address universal problems of organizing (Puranam, Alexy, & Reitzig, 2014). Thus, a conclusion can be drawn that those theories attempt to explain change related to technology by deploying explanations that effectively stay clear of the (technological) elephant in the room.

As AI, big data, data analytics, digital assistants, ubiquitous identification, Fintech and GAFAM technology platforms gain momentum, it has become increasingly clear that traditional constraints around boundaries, scale, scope, expertise and industry have fractured. Some organization design scholars are already arguing that technological and organizational architectures operate unitarily to systematically manage flow processes (Baldwin, 2020). The impact of technology is profound as it not only automates work processes but also opens up the possibility to informate work processes, a factor that leads to struggles over what and whose worldview gets enacted (Thomas, 1994; Zuboff, 1988). Indeed, a lack of societal involvement and even control over the design of modern digital technologies can precipitate an emergence of unprecedented regimes for organizational and societal surveillance (Zuboff, 2019). As has become clear by now, our theorizing may benefit from avoiding the static and stale categories of technology and organization. To progress, we may benefit from embracing the mutual constitution, reciprocal influence, accommodation and resistance that are at the core of the technology-organizing relation. Simply put, from the simplest nineteenth-century bureaucracy to the Uberization of the twenty-first, technology is integral to and constitutive of organizing. In the next section, we offer a regime of organizing framework as an example of how organizational scholars can espouse the entanglement between technology and organizing in their theorizing.

Viewing Uberization from a Regime of Organizing Perspective

A possible way to understand the co-constitutive relationship between technological change and organizational change would be to look at how organizations bring novel regimes of organizing into the world. We define *regime of organizing* as the sociomaterial arrangement of practices, rules, norms, framings and material infrastructures that provides distinct affordances

for organizing and shapes the decision-making, control and coordination in organizing. Similar to how Foucauldian regimes of truth frame acceptable knowledge, organizing regimes frame and constrain organizing possibilities. Specifically, an organization may embrace a new regime of organizing in order to open up new possibilities for how work is coordinated, how activities are evaluated, how employees are managed, how formal rules and informal norms are applied and how the material infrastructure supporting the organization's activities is arranged.

We find the term 'regime' useful because it captures how the different elements of organizing are entwined with each other. A regime perspective, just as in politics, reminds us that regimes are historically contingent and not everlasting. Because regimes emphasize how specific sociomaterial arrangements constrain and enable action, they give rise to and limit possibilities for organizing (Hilgartner, 2017; Jasanoff, 2004). These ways of organizing appear widely accepted or even 'natural' for those evolving with a stable and established regime. In science, novel technological deployments bring about different epistemic regimes and with them differences in how to interpret data, deploy laboratory equipment, interpret findings and produce objective knowledge (e.g. Galison, 1997). In management research, differences in regimes of knowing have been offered to explain how the introduction of a new technology associated with new types of expertise and practitioners can lead to radical changes in the work practices and may even render the existing workforce redundant (e.g. Pachidi et al., 2020). Most important for the debate on technology and organizing, a regime of organizing perspective approaches technology and structure as entwined, and that entwinement affords the emergence of new forms of organizing.

Adopting a regime of organizing perspective puts in focus the interrelationship between the organizing practices that structure and coordinate activities, the change in valuation schemes that guide behaviours, and the evolution of

authority arrangements. For example, deploying a regime of organizing perspective to study the emergence of the assembly line, a century ago, would emphasize how the work practices evolved toward standardized activities with repetitive, simpler and well-defined tasks. The perspective would also emphasize the quantification of performance as a valuation scheme that enabled those organizing practices, with speed and efficiency becoming key performance indicators. Finally, the perspective would also highlight how the authority arrangements necessarily morphed because the work now required lesser skills and expertise, workers were seen as interchangeable and had, at least till they organized, limited power to negotiate salaries, rights and work conditions. While the regime of organizing perspective covers a similar terrain as the analyses of forms of organizing, such as Uberization, Fordism and McDonaldisation, we view these perspectives as specific to their contexts and as foregrounding governance issues and social relations. The regimes perspective treats technology as neither causal nor external but as entangled and constitutive of organizing possibilities. Further, the regimes perspective gives equal importance to authority arrangements and to valuation schemes. As is becoming clear in recent debates about how regulators and society must respond to information capitalism, the legal and regulatory sphere is heavily implicated (see Cohen, 2019; US Congress, 2020; Zuboff, 2019). These broader changes, as noted by Davis and Sinha, are inextricably entwined with the new work practices afforded under the new form.

Analytically, Uberization can be fruitfully studied from a regime of organizing perspective, with an emphasis on how new practices of coordination, decision making and control emerge from the possibilities inherent to the new algorithmic technologies. Coordination via algorithm entails partitioning work into simple bite-sized tasks that can then be distributed to workers using algorithms that match the skills and capabilities of workers to the employers' needs, ensuring optimization and efficiency (Faraj et al., 2018; Boudreau & Lakhani, 2013).

The allocation of work is often done on a predictive basis, as historical data, processed by machine learning algorithms, can predict where the demand for drivers will be located. Related classification and predictive modelling algorithms increase the automation of decisions for aspects such as whom to hire and let go. Such automation may decrease costs and remove the limits of human bounded rationality and potential bias. From an organizing perspective, the locus of various decisions, especially on the functional and the tactical level, is moved to the algorithm. Quite often, those automated decisions are blackboxed to humans, who may not understand the inner workings of the algorithm used or the data that was fed into it. Another essential aspect of the Uberization model is a reliance on algorithmic technologies for enacting control. The digital capture of embodied activities (e.g. interactions, bodily movements, facial expressions) via platforms and sensors brings to the fore new visibilities and surveillance into workers' performance (see Brayne, 2017; Kellogg, Valentine, & Christin, 2020).

Novel organizing practices bring about new valuation schemes that provide a general sense of what passes for appropriate performance and orient participants' actions accordingly (MacIntyre, 1981). The types of digital data that are captured and processed by algorithms, along with the decision criteria and values that emerge through learning algorithms, guide what aspects of work performance are rendered valuable (Orlikowski & Scott, 2014). Through its usage of customer feedback (reviews, five-star ratings), Uberization incorporates a more direct evaluation procedure that is closer to the service (ride) encounter. This form of quantification makes the evaluation more immediate and supposedly offers a direct route for improvement (changed behaviour for next ride). Shifting the evaluation of worker performance from the manager to the customer may facilitate the rewarding of strong performers, such as giving them preferential access to ride requests. However, the way the algorithm works is blackboxed to drivers and may even hide inherent biases toward or against certain classes of drivers. As a result, workers often try to guess

how the algorithms work and may even engage in counter performances in their effort to hide, resist, or to improve their scores (Brayne & Christin, 2020; Kellogg et al., 2020).

Finally, authority arrangements are also reconfigured or redistributed as the Uberization regime gains ground. New drivers, now providing their own work tools (vehicles), are enrolled via an algorithmically coordinated labour market. These all-encompassing algorithms are consequential as they bring about a new organizational reality where previously considered complex tasks get broken up, allocated, evaluated and tightly controlled with little human involvement. Indeed, the increased deployment of algorithms in management is already significantly reducing workers' role in affecting how work is organized, priced and compensated (see Woodcock & Graham, 2019). Expertise becomes less valued as tasks are broken down into simple activities that are algorithmically assigned to freelancers via the uberized platforms of UpWork or Amazon Mechanical Turk. The expertise of taxi drivers in terms of knowing city streets and ability to navigate traffic is of little consequence when the Uber algorithm can generate real-time the best way to reach a destination. As a result, workers find themselves outside the scope of existing labour laws, with limited power to influence core labour issues, such as minimum wage, unemployment compensation, negotiated work rules, overtime pay and retirement benefits (Cameron, Garrett, & Spreitzer, 2017; Davis, 2016). Indeed, the new work landscape strengthens the authority of uberized firms and gives them unheralded powers to set wages and work conditions.

Our regime of organizing perspective aligns with performative perspectives on organizational algorithms (e.g. Glaser, Pollock, & D'Adderio, 2020; Orlikowski & Scott, 2014). Such explanations take into account the relational and socio-material entanglements that necessarily implicate human and non-human actors. Thus, rather than viewing technology entitatively or as a tool, organizational theorists need to account for their effect in the world via the valuation schemes and organizing possibilities they make possible. By

pointing at the entwinement of organizing practices, valuation schemes and authority arrangements, our regime of organizing perspective helps clarify how novel forms of organizing emerge from the performative struggles around the co-constitution of these elements, as vividly shown by the Davis and Sinha description of the Uber variegated struggles in seven different contexts. These struggles involving technology will necessarily reshape core organization notions such as control, coordination, decentralization and decision making (see Faraj et al., 2018; Kellogg et al., 2020; Vergne, 2020). Indeed, what is becoming overwhelmingly clear is that organizations and organization scholars can no longer view technology entitatively but must recognize the co-constitutive entanglement of technology with task, structures and forms of organizing.

Conclusion: The Urgency to Elucidate the Role of Technology in Organizing

We were motivated to write this article because Davis and Sinha (2021) importantly remind organizational theorists that national, political and institutional factors play a critical role in shaping how forms of organizing, such as Uberization, are taking shape and being contested in different national contexts. We find it important and useful to take their suggestion to approach technology and institutional configurations as mutually constitutive. In turn, we suggest that the lens of co-constitution also be applied to the increasingly visible and consequential entwinement between technology and organizing. Doing so challenges old notions where technology is conceived of as an independent force that is either internal or external to the organization; one that acts 'deterministically' or as a variable to be tweaked per 'managerial choice'. We offer the regime of organizing as a possible perspective to approach technological change as entwined with organizing. Approaching Uberization as a regime of organizing can generatively unpack how new ways of coordinating work, making decisions and controlling workers emerge and are contested.

We are in the midst of deep transformations of what we have come to conceptualize as work and organizing. Currently dominant conceptualizations of technology as separate, exogenous, or causal are too limiting to fruitfully address the new forms of organizing that are currently emerging. Our core suggestion is less about foregrounding technology as a missing ingredient and more about giving it appropriate consideration as phenomena, such as Uberization, challenge existing organizational forms and bring about a technology-enhanced form of capitalism that seems to be characterized by precarious work, recasting individuals as contractors rather than workers, algorithmic coordination mechanisms, and noticeably tighter surveillance and control. Conceptually, organizational scholars could benefit from going beyond cause-and-effect thinking and approach these phenomena with configurational styles as we have with the regime of organizing perspective. Benefits could also accrue from comparative studies, as Davis and Sinha so adroitly demonstrated, to elucidate important explanations and relations. Furthermore, longitudinal studies that look at the changing interrelationship between linked elements, such as technology, structures, forms, institutions, professions and societal politics, would be particularly revealing.

As Lipton had argued with regard to the epistemic virtues of explanation, the ‘best’ explanation must balance between the loveliest and the likeliest criterion. Our paper has offered that in recent years many organizational theorists have increasingly been engrossed in developing what they consider, from their theoretical vantage point, ‘lovely’ explanations that de-emphasized technology or reduced it to an exogenous factor. Today, the more ‘likely’ explanation, one where technology plays an endogenous and co-constitutive role in theories of the emerging forms of organizing, is increasingly becoming unavoidable. We encourage such a reconsideration.

Acknowledgements

We are grateful for the ‘lovely’ guidance of editors Joep Cornelissen and Markus Hollerer that ensured that this paper became ‘likely’. The paper has also

benefited from the insight of our colleagues: Shaz Ansari, Aditi Chandrasekhar, Arvind Karunakaran, Anna Kim, Sri Kudaravalli, Paul Leonardi, Saku Mantere, Wadih Renno, Thomas Roulet, Karla Sayegh and Paul Tracey. Samer Faraj would like to acknowledge the support of the Canada Research Chairs program.


Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article.

ORCID iD

Stella Pachidi  <https://orcid.org/0000-0003-4024-079X>

Notes

1. Like Davis and Sinha, our focus is on the technology–organizing relation. Thus, we do not engage with the burgeoning literature addressing technology strategy, technology cycles, incremental vs. architectural innovation, or how to manage innovation processes.
2. Globalization has been ongoing for centuries. For lack of a more precise term, we use globalization here to refer to the late twentieth-century organizational form built on the delocalization of manufacturing, R&D and sales.

References

- Agrawal, A., Gans, J. S., & Goldfarb, A. (2019). Exploring the impact of artificial intelligence: Prediction versus judgment. *Information Economics and Policy*, 47, 1–6.
- Ahuja, G., Lampert, C. M., & Tandon, V. (2008). Moving beyond Schumpeter: Management research on the determinants of technological innovation. *Academy of Management Annals*, 2(1), 1–98.
- Anderson, P., & Tushman, M. L. (1990). Technological discontinuities and dominant designs: A cyclical model of technological change. *Administrative Science Quarterly*, 35, 604–633.

- Baldwin, C. Y. (2019). Setting the stage for corporate headquarters: A technological explanation for the rise of modern industrial corporations. *Journal of Organization Design*, 8(1), 1–16.
- Baldwin, C. Y. (2020). Design Rules, Volume 2: How technology shapes organizations. Harvard Business School Working Papers, WP 20-033.
- Barley, S. R. (1986). Technology as an occasion for structuring: Evidence from observations of CT scanners and the social order of radiology departments. *Administrative Science Quarterly*, 31, 78–108.
- Bodrožić, Z., & Adler, P. S. (2018). The evolution of management models: A neo-Schumpeterian theory. *Administrative Science Quarterly*, 63, 85–129.
- Boudreau, K. J., & Lakhani, K. R. (2013). Using the crowd as an innovation partner. *Harvard Business Review*, 91(4), 60–69.
- Boudreau, M. C., & Robey, D. (2005). Enacting integrated information technology: A human agency perspective. *Organization Science*, 16, 3–18.
- Braverman, H. (1974). *Labor and monopoly capital: The degradation of work in the twentieth century*. New York: Monthly Review Press.
- Brayne, S. (2017). Big data surveillance: The case of policing. *American Sociological Review*, 82, 977–1008.
- Brayne, S., & Christin, A. (2020). Technologies of crime prediction: The reception of algorithms in policing and criminal courts. *Social Problems*, 0, 1–17. <https://doi.org/10.1093/socpro/spaa004>
- Burton, M. R., Obel, B., & DeSanctis, G. (2011). *Organizational design: A step by step approach* (2nd edition). Cambridge: Cambridge University Press.
- Cameron, L. D., Garrett, L., & Spreitzer, G. (2017). Alternative work arrangements: Two images of the new world of work. *Annual Review of Organizational Psychology and Organizational Behavior*, 4, 473–499.
- Child, J. (1972). Organization structure and strategies of control: A replication of the Aston study. *Administrative Science Quarterly*, 17, 163–177.
- Child, J. (1974). What determines organization? *Organizational Dynamics* (Summer 1974), 2–18.
- Cohen, J. E. (2019). Between truth and power: The legal constructions of informational capitalism. New York: Oxford University Press.
- Daft, R. L. (2009). *Principles of management*. Boston, MA: Cengage Learning.
- Davis, G. F. (2016). *The vanishing American corporation: Navigating the hazards of a new economy*. Oakland, CA: Berrett-Koehler Publishers.
- Davis, G. F., & Sinha, A. (2021). Varieties of Uberization: How technology and institutions change the organization(s) of late capitalism. *Organization Theory*, 2, DOI: 10.1177/2631787721995198
- Donaldson, L. (2001). *The contingency theory of organizations*. Thousand Oaks, CA: SAGE Publications.
- Edwards, R. (1979). *Contested terrain: The transformation of the workplace in the twentieth century*. New York: Basic Books.
- Eidelson, J. (2020) Election day gave Uber and Lyft a whole new roadmap. *Bloomberg Businessweek*. <https://medium.com/bloomberg-businessweek/election-day-gave-uber-and-lyft-a-whole-new-road-map-e5d7748ad01a> (accessed November 10 2020).
- Ellul, J. (1954/1964). *The technological society*. Toronto: Vintage Books.
- Faraj, S., Pachidi, S., & Sayegh, K. (2018). Working and organizing in the age of the learning algorithm. *Information and Organization*, 28(1), 62–70.
- Feenberg, A. (1999). *Questioning technology*. London: Routledge.
- Frey, C. B. (2019). *The technology trap: Capital, labor, and power in the age of automation*. Princeton, NJ: Princeton University Press.
- Friedman, T. (2005). *The world is flat*. New York: Farrar, Straus & Giroux.
- Galbraith, J. (1973). *Designing complex organizations*. Reading, MA: Addison-Wesley.
- Galison, P. (1997). *Image and logic: A material culture of microphysics*. Chicago: University of Chicago Press.
- Glaser, V. L., Pollock, N., & D'Adderio, L. (2020). The biography of an algorithm: Performing algorithmic technologies in organizations. *Organization Theory*.
- Goodman, P., & Sproull, L. S. (Eds.) (1990). *Technology and organizations*. San Francisco, CA: Jossey-Bass.
- Heidegger, M. (1954/1977). *The question concerning technology*. New York: Garland Publishing.
- Hilgartner, S. (2017). *Reordering life: Knowledge and control in the genomics revolution*. Cambridge, MA: MIT Press.
- Hinings, B., Gegenhuber, T., & Greenwood, R. (2018). Digital innovation and transformation: an institutional perspective. *Information and Organization*, 28, 52–61.

- Iansiti, M., & Lakhani, K. R. (2020). *Competing in the age of AI: Strategy and leadership when algorithms and networks run the world*. Boston, MA: Harvard Business Press.
- Jasanoff, S. (2004). *States of knowledge: The co-production of science and the social order*. London: Routledge.
- Kellogg, K. C., Valentine, M. A., & Christin, A. (2020). Algorithms at work: The new contested terrain of control. *Academy of Management Annals*, 14(1), 366–410.
- Kelly, K. (2010). *What technology wants*. New York: Penguin.
- Lawrence, P. R., & Lorsch, J. W. (1967). *Organization and environment*. Boston, MA: Harvard Business School Press.
- Leonardi, P. M. (2013). Theoretical foundations for the study of sociomateriality. *Information and Organization*, 23(2), 59–76.
- Leonardi, P. M., & Barley, S. R. (2010). What's under construction here? Social action, materiality, and power in constructivist studies of technology and organizing. *Academy of Management Annals*, 4(1), 1–51.
- Lipton, P. (2004). *Inference to the best explanation* (2nd edition). New York: Routledge.
- MacIntyre, A. (1981). *After virtue: A study in moral theory*. London: Duckworth.
- Marx, K. (1847/1955). *The poverty of philosophy*. Moscow: Progress Publishers.
- Misa, T. J. (1994). Retrieving sociotechnical change from technological determinism. In M. Roe Smith & L. Marx (Eds.), *Does technology drive history?* (pp. 115–141). Cambridge, MA: The MIT Press.
- Nadler, D., & Tushman, M. L. (1988). *Strategic organizational design*. Glenview, IL: Scott Foresman & Company.
- Noble, D. (1977) *America by design: Science, technology, and the rise of corporate capitalism*. New York: Alfred Knopf.
- Orlikowski, W. J. (1992). The duality of technology: Rethinking the concept of technology in organizations. *Organization Science*, 3, 398–427.
- Orlikowski, W. J. (2010). The sociomateriality of organisational life: Considering technology in management research. *Cambridge Journal of Economics*, 34, 125–141.
- Orlikowski, W. J., & Scott, S. V. (2014). What happens when evaluation goes online? Exploring apparatuses of valuation in the travel sector. *Organization Science*, 25, 868–891.
- Pachidi, S., Berends, H., Faraj, S., & Huysman, M. (2020) Make way for the algorithms: Symbolic actions and change in a regime of knowing. *Organization Science*, published online in advance. <https://doi.org/10.1287/orsc.2020.1377>
- Parker, G. G., Van Alstyne, M. W., & Choudary, S. P. (2016). *Platform revolution: How networked markets are transforming the economy and how to make them work for you*. New York: WW Norton & Company.
- Perrow, C. (1984). *Normal accidents*. New York: Basic Books.
- Puranam, P., Alexy, O., & Reitzig, M. (2014). What's 'new' about new forms of organizing? *Academy of Management Review*, 39(2), 162–180.
- Ritzer, G. (1998). *The McDonaldization thesis: Explorations and extensions*. London: SAGE Publications.
- Schilling, M. (2017). *Strategic management of technological innovation*. New York: McGraw-Hill.
- Schumpeter, J. A. (1942). *Capitalism, socialism, and democracy*. New York: Harper & Brothers.
- Scott, W. R. (1990). Technology and structure: An organizational-level perspective. In P. S. Goodman & L. E. Sproull and Associates (Eds.), *Technology and organizations* (pp. 109–143). San Francisco, CA: Jossey-Bass.
- Scott, W. R., & Davis, G. F. (2007). *Organizations and organizing: Rational, natural and open systems perspectives*. London: Routledge.
- Thomas, R. J. (1994). *What machines can't do: Politics and technology in the industrial enterprise*. Berkeley, CA: University of California Press.
- Thompson, J. D. (1967). *Organizations in action*. New York: McGraw-Hill.
- Tripsas, M. (1997). Unraveling the process of creative destruction: Complementary assets and incumbent survival in the typesetter industry. *Strategic Management Journal*, 18, 119–142.
- Tushman, M. L., & Nelson, R. R. (1990). Introduction: Technology, organizations, and innovation. *Administrative Science Quarterly*, 35(1), 1–8.
- USCongress Subcommittee on Antitrust, Commercial and Administrative Law of the Committee on the Judiciary (2020). Investigation of competition in digital markets. Available at https://judiciary.house.gov/uploadedfiles/competition_in_digital_markets.pdf (accessed January 15 2020).

- Vergne, J. (2020). Decentralized vs. Distributed Organization: Blockchain, Machine Learning and the Future of the Digital Platform. *Organization Theory* 1(4): 1–26. <https://doi.org/10.1177/2631787720977052>
- Weick, K. E. (1990). Technology as equivoque: Sensemaking in new technologies. In P. S. Goodman & L. E. Sproull and Associates (Eds.), *Technology and organizations* (pp. 1–44). San Francisco, CA: Jossey-Bass.
- Williamson, O. E. (1988). Technology and transaction cost economics. *Journal of Economic Behavior and Organization*, 10, 355–363.
- Winner, L. (1977). *Autonomous technology: Technics-out-of-control as a theme in political thought*. Cambridge, MA: MIT Press.
- Woodcock, J., & Graham, M. (2019). *The gig economy: A critical introduction*. Cambridge: Polity.
- Woodward, J. (1965). *Industrial organization: Theory and practice*. New York: Oxford University Press.
- Zammuto, R. F., Griffith, T. L., Majchrzak, A., Dougherty, D. J., & Faraj, S. (2007). Information technology and the changing fabric of organization. *Organization Science*, 18, 749–762.
- Zuboff, S. (1988). *In the age of the smart machine: The future and power of work*. New York: Basic Books.
- Zuboff, S. (2019). *The age of surveillance capitalism: The fight for a human future at the new frontier of power*. London: Profile Books.

Author biographies

Samer Faraj holds the Canada Research Chair in Technology, Innovation & Organizing at the Desautels Faculty of Management, McGill University. He is the head of the research group on complex collaboration and directs the Desautels PhD program. His current research focuses on complex collaboration and on how emergent technologies are transforming coordination and allowing new forms of organizing to emerge.

Stella Pachidi is a lecturer in information systems at Judge Business School, University of Cambridge. She received her PhD from Vrije Universiteit Amsterdam. Her research interests include digital transformation, practices and processes of collaboration across boundaries, and the impact of emerging technologies on work, particularly from a knowledge perspective.