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The Institutional Logic of Digitalization

THE INSTITUTIONAL LOGIC OF DIGITALIZATION

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ABSTRACT

Digital technologies have fundamentally changed organizations, industries, and even the society. Although institutional theory provides rich array of perspectives to both the content and dynamics of such changes, research at the intersection of institutional scholarship and digitalization has remained scarce. In this essay, I draw on the institutional logics perspective to elaborate digitalization as involving a new set of interconnected managerial beliefs and norms, organizational practices, and diverse material and social structures that together complement and challenge the established logics in organizations and institutional fields. I draw attention to two central organizing principles in the logic of digitalization: the pursuit of digital omniscience – the efforts to represent and conceive the world through digital data – and digital omnipotence – the efforts to bring activities inside and outside organizations under the control of information systems. I conclude the essay by elaborating how the institutional logics perspective can help understand organization-level efforts to leverage digitalization by incumbent corporations and new digital-native companies.

Keywords: Institutional logics; digitalization; digital transformation; information technology; practice-driven institutionalism; data-driven management

This volume of *Research in Sociology of Organizations* is a highly welcome addition to organizational study of digitalization. Institutional theory is uniquely positioned to explain and theorize complex large-scale change processes, such as

those brought about by the contemporary information technologies. Institutional theorists have only recently begun to attend to the societal and business impact of ubiquitous digital data, algorithms, and digital platforms (Faik, Barrett, & Oborn, 2020; Hinings, Gegenhuber, & Greenwood, 2018). In these early contributions, digital transformation was conceived as an exogenous shock on institutionalized structures created by new revolutionary digital products and services, often called "digital innovations" (Berente & Seidel, 2022; Hinings et al., 2018; Nambisan, Wright, & Feldman, 2019). Yet, this definition depicts digital transformation less as a process than an outcome. While the concept of *digitalization* implies a process through which companies come to develop and utilize digital technologies, researchers often define digitalization merely as the increasing use of digital technologies (e.g. Balsmeier & Woerter, 2019) or more broadly (but vaguely) as "the ways in which social life is organized through and around digital technologies" (Leonardi & Treem, 2020, p. 1602). By conceiving technology as an exogenous shock, we may, however, fail to fully explain how changes in managerial thinking recursively contribute to the development and application of technologies (Zuboff, 2019). In this essay, I argue that we ought to conceive digitalization as a broader change in organizing that involves interconnected changes in technologies, cognitions, and structures. In short, digitalization is best explained as the emergence and triumph of a new institutional logic.

To begin with, I propose that we understand *digitalization* as a broad process that extends far beyond the diffusion and exploitation of technology. Nearly all observers identify the distinctive characteristic of contemporary information technologies, and particularly "artificial intelligence," on their effects on human work (Brynjolfsson & McAfee, 2014; Cepa & Schildt, 2022; Murray, Rhymer, & Sirmon, 2021; Raisch & Krakowski, 2021). To capture these effects that technology has on organizing and management, I propose the following definition:

> *Digitalization represents organizations' increasing reliance on software-based automation – grounded in data and algorithms – over human expertise and work.*

Thus conceived, digitalization involves not only new technologies but also new organizational practices, new institutional infrastructures, and new managerial norms and beliefs. Such a broader conception helps elucidate the larger organizing principles of digitalization and help examine how they contradict the existing institutional logics in firms and organizational fields. I suggest that digitalization processes can be usefully understood as growing conformity of individuals, organizations, and fields with the new *institutional logic of digitalization*. The spread of this new logic has legitimizes inherently uncertain bets on information technology and enables prospective coordination of digital initiatives within and across organizations.

I conclude this essay by discussing how the new institutional logic competes with and complements the established institutional logics, which now appear markedly human centric. The perspective provides us with a new powerful framework for explaining the ongoing digital transformation and specifically the distinctive paths followed by the "born digital" companies founded on the logic of digitalization and the incumbents with strongly entrenched human-centric institutional logics.

AN INSTITUTIONAL PERSPECTIVE TO DIGITALIZATION

Once we reconceive digitalization as the systemic replacement of human routines with automated processes (cf. Hinings et al., 2018), we can clearly see that digitalization is not just a trigger of institutional changes, but itself entails complex changes in diverse institutionalized structures. The adoption of digital technologies that replace human observations and automate human routines involve widespread changes in organizing, management, and work. Moreover, the systemic transition represented by digitalization can be observed meaningfully at the level of societies, industries, organizations, and even individual organizational routines.

How then should an institutional theorist approach digitalization? I suggest a fruitful approach is to elaborate the interconnected elements that constitute the new digitalized organizations and organizational fields and to trace how related norms, belief, practices, and innovations replace or complement the pre-digital ones. Seen through the institutional lens, digitalization involves the spread of new interconnected organizational practices and technologies that is spurred and supported by associated changes in beliefs, norms, and habits of managers and investors. Institutional theory suggests that radical transformations may require companies to adapt their existing bundles of deeply interconnected practices (Smets, Aristidou, & Whittington, 2017) that relate to entrenched managerial norms and beliefs concerning the desirability and development of various practices (Lounsbury, 2007).

To appreciate digitalization as an institutional change, I suggest we need to recognize at least four interconnected "elements" of digitalization: (1) expert knowledge and skills, (2) material artifacts and infrastructures in the organization and its environment, (3) managerial norms and beliefs, and (4) digital products and services developed by the focal organization and its competitors. These elements along with examples are summarized in Fig. 1. The first two are often seen as intrinsically linked elements of organizational practices.

Organizational Practices: Knowledge, Skills, Material Artifacts, and infrastRuctures

Scholars have long noted that new digital technologies tend to reshape organizations (Jarvis, Eden, Wright, & Burton-Jones, 2022), industries (Nambisan, Siegel, & Kenney, 2018), and even the public sphere (Etter, Illia, Meggiorin, & Colleoni, 2022; Faik et al., 2020; Gümüsay, Raynard, Albu, Etter, & Roulet, 2022). These technologies are embedded in new organizational practices that involve complex sociomaterial "assemblages" or "ensembles" (Glaser, Pollock, & D'Adderio, 2021; Orlikowski & Iacono, 2001; Orlikowski & Scott, 2008). Automated processes that replace human-centric routines involve diverse material tools, regulatory structures, relationships, abstract knowledge, and embodied skills. While it is trendy to emphasize the intrinsic interconnected of these various elements, there are obvious reasons to distinguish skills and expertise of humans
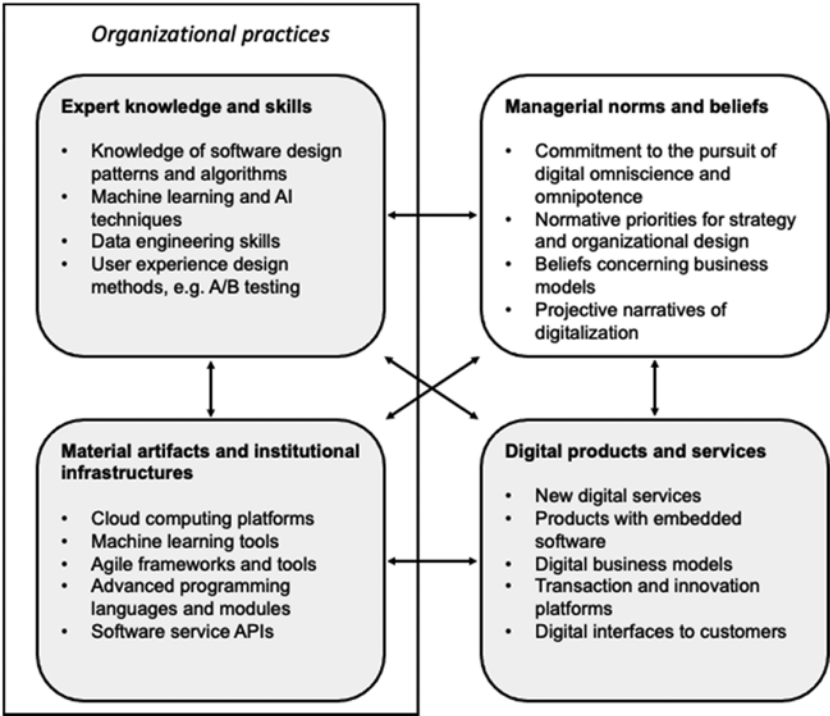
Organizational practices

Expert knowledge and skills

- Knowledge of software design patterns and algorithms
- Machine learning and AI techniques
- Data engineering skills
- User experience design methods, e.g. A/B testing

Managerial norms and beliefs

- Commitment to the pursuit of digital omniscience and omnipotence
- Normative priorities for strategy and organizational design
- Beliefs concerning business models
- Projective narratives of digitalization

Material artifacts and institutional infrastructures

- Cloud computing platforms
- Machine learning tools
- Agile frameworks and tools
- Advanced programming languages and modules
- Software service APIs

Digital products and services

- New digital services
- Products with embedded software
- Digital business models
- Transaction and innovation platforms
- Digital interfaces to customers

Fig. 1.   Four Core Elements of Digitalization.

and the "material" side of technologies. The latter category incorporates not only software code and cloud infrastructures but also institutions that are "material" in a slightly more abstract sense, such as widespread technical standards and programming interfaces.

The human side of digitalization represents new forms of expertise that are more abstract and less rooted in specific contexts than pre-digital knowledge and skills (Glaser et al., 2021; Loscher & Bader, 2022). Software engineers and data scientists can often switch industries effortlessly; many data analysis tasks can be carried out with rather superficial understanding of the domain. Whereas traditional professions relied on institutionalized mandates, data scientists, and computer engineers can often derive legitimacy from "transformative contributions" (Croidieu & Kim, 2018), their ability to construct new digitalized processes that are more effective than the non-digital ones. Like any new expert group, once digital professionals establish a foothold in the organization, they are likely to apply their expertise to diverse problem areas (Loscher & Bader, 2022). At times, the new form of expertise can have a widespread change in company practices and culture (Canato, Ravasi, & Phillips, 2013; Cepa & Schildt, 2022), especially as organizations add new data-centric roles, such as the Chief Digital Officer (CDO) (Firk, Hanelt, Oehmichen, & Wolff, 2021).

The material side of digital practices includes foremost the rapidly developing software and hardware. The role of technological advances should not be discounted; the more impressive the tools, the more effective the experts. In the past decade or so, the biggest advances have taken outside company boundaries in the form of generic cloud computing platforms and software tools.[1] Although many of the machine learning approaches used by companies have been available for decades, the new infrastructures enable cheaper, faster, easier, and more secure development and implementation of machine learning as parts of automated business processes. This material side of digital practices can diffuse extremely rapidly across geographic and industry boundaries, as cloud infrastructures are typically made available globally from their infancy. Yet, digitalized practices often require a significant cadre of experts with postgraduate degrees that tend to be geographically concentrated. While technical knowledge is increasingly available for free on the Internet, research has shown technical expertise to still diffuse rather slowly (Tambe, 2014).

Whereas technological capabilities are often conceived to depend on assets held by the focal company (e.g. Sirmon, Hitt, & Ireland, 2007), new digital practices often depend on the systems, infrastructures, and even talent held by customers and partners (Cepa & Schildt, 2019, 2022). The primary event that enabled Uber to launch its digital ride hailing service in 2010 had taken place with the launch of iPhone in 2007. The success of the iPhone meant that a sufficient number of potential drivers and customers had a powerful Internet-connected computer with global positioning system (GPS) device in their pocket. In an insightful and influential article, Yoo, Henfridsson, and Lyytinen (2010) elaborated how the layered modular architecture of contemporary information technologies allows continuous and distributed innovation, where companies creatively leverage digital infrastructures and data assets across firm boundaries.

Managerial Norms and Beliefs

Organizations do not passively absorb new digital tools and related expertise from their institutional environment, nor do these elements form automatically into new organizational practices. While the sociomaterial perspective has advanced our understanding of technologies in the lived reality of organizations (Orlikowski & Scott, 2008), it has ignored changing managerial norms and beliefs that govern the investment and use of technology (Bodrožić & Adler, 2018). Adopting digital practices tends to require resources that need to be allocated by management. The institutional logics research has shown in diverse settings how the development of entirely new kinds of practices and practice bundles is often preceded by a change in managerial norms and beliefs (Dalpiaz, Rindova, & Ravasi, 2016; Lounsbury, 2007; Spicer & Sewell, 2010).

In my recent book (Schildt, 2020), I suggested that the new managerial norms driving digitalization centrally include two abstract ideals or organizing principles. First, managers broadly pursue what I call *digital omniscience* – they seek to "understand" the organization's internal processes, customers, partners, and business environment through collection and analysis of digital data. While

the data and analyses can be used to inform nonroutine human deliberations, they are increasingly generated at high frequency to support automated processes. Second, managers pursue *digital omnipotence* – the ability to control all of the organization's central processes with software in real time, so as to adapt its activities optimally to the insights created by digital omniscience. This involves the redesign of business processes around data, optimization models, and software in order to create digital control over employees, machines, and customer experience. I am not suggesting that these are explicit ideals that managers consciously follow, but they are rather an idealized synthesis of the norms and attitudes evident in digitalized companies (Zuboff, 2019) and in discourse propagated by consulting companies and advocates of digitalization (see, e.g., McAfee & Brynjolfsson, 2012). According to this new managerial mindset, the failure of a company to capture and analyze streams of data concerning its operations and customers has come to be perceived as bad management.

Managers have further adopted diverse beliefs (or knowledge, if you prefer) about digital business models, digital cultures, and digital operating models. These perspectives diffuse in the form of success stories (of, e.g., Amazon, Google, Netflix, and Spotify), consulting company materials, and information system providers' whitepapers (e.g. AWS, Microsoft, and Salesforce). More recently, business schools and universities have jumped in, launching somewhat belatedly their own digital strategy, digital transformation, and data science courses. The new managerial knowledge is reflected in shared concepts, such as "DAU" and "MAU" (daily and monthly active users), that help make sense of present and future business opportunities. This knowledge incorporates a host of guiding principles, including the value of pursuing agility, customer centricity, and modularity, and the need to develop and connect with ecosystems (Jacobides, Cennamo, & Gawer, 2018; Schilling, 2000). Some beliefs relate explicitly to organizing, such as the normative value attributed to team-based structures and the belief that organizational structure should mirror technological architecture.

Societal meta-narratives of the digital future are also an important factor in shaping perceived attractiveness of digital investments and organizing. There is certainly a widespread consensus of a future where software services will be located in the cloud (including "edge cloud"), used through mobile devices, and accessible to other systems via application programming interfaces (APIs). Specific digitalization narratives include visions of the "programmable world,"[2] "the industrial Internet," "Industry 4.0," as well as various accounts of 5G and augmented reality/virtual reality (AR/VR) interfaces. Digital technologies, such as Bitcoin, can often be categorized and understood in many parallel ways that provide opportunities for their flexible appropriation in entrepreneurial visions and strategic initiatives (Vergne & Swain, 2017). Institutional theorists are well positioned for both critically analyzing such narratives and contributing to their elaboration. The latter path is exemplified by a recent essay theorizing decentralized and distributed digital organizations (Vergne, 2020).

Managerial norms and beliefs regarding digitalization are often prospective. Whereas expert knowledge and skills are grounded in existing technology and efficacy of organizational practices, managerial beliefs concerning digitalization

may rely on analogies and projections (Garud, Schildt, & Lant, 2014). Digitalization narratives in organizations borrow heavily on broader societal discourses that entail their own projections, hopes, and future commitments that often lack direct grounding in existing evidence (Garud, Lant, & Schildt, 2019). Managerial beliefs and norms related to digitalization have now spread widely beyond the managerial cadres through the popular fame and interest in technology giants and "unicorn" start-ups. Not long ago, investors poured money to WeWork with hopes of it exploiting "scalable business model" to attain profits far exceeding established real estate companies, prompting the firm to create an ill-fated social networking app (Brown & Farrell, 2021).

As self-managed organizations are gaining prominence, more and more expert employees have autonomy and hold decision-making powers, becoming carriers for the managerial norms and beliefs regarding digital business and organization. Data-centric thinking entails increasingly widespread aesthetic and discourses that motivate the collection and use of data among managers and non-managers (Saifer & Dacin, 2022), irrespective of the uncertain value and unpredictable implementation challenges of large-scale data gathering, application of machine learning, and software development in general.

Digital Products and Services

The final element of digitalization is the customer-facing offerings that utilize digital technology, often called "digital innovation" (Hinings et al., 2018). These are the culminations of digitalization that depend, at least to some extent, on the preceding three elements of digitalization. New digital products and services can quickly make the previous pre-digital sources of revenue and profit obsolete, thus upending entire industries (Kumaraswamy, Garud, & Ansari, 2018).

Although digital innovations are the final manifestation of digitalization, they are also a key catalyst in the process; clear feedback loops exist from digital innovations to the three elements discussed above. New disruptive digital products and services commonly receive extensive media coverage, garnering attention of managers and front-line employees across industry boundaries. The successful introductions of digital products and services promote new data-centric managerial norms and beliefs, data-related expertise, and greater investment in digital systems at the level of individual companies, fields, and society at large. Particularly in Europe, the envy of the US-based "big tech" has fueled public investment into technical education and digital infrastructure (see, e.g., European Union (EU)'s "Digital Europe" program worth €7.6 billion). Commercial successes of digital services have the most powerful source of legitimacy in our times: money.

THE INSTITUTIONAL LOGIC OF DIGITALIZATION

The systemic nature of digitalization that involves interconnected norms, beliefs, practices, and material structures suggests that we might be able to identify it as a new institutional logic (Friedland & Alford, 1991; Thornton, Ocasio, & Lounsbury, 2012). This is helpful in capturing the central role of new managerial

beliefs and mindsets in digitalization because the institutional logics perspective "adopts a practice-theoretical approach to culture … focusing on how symbolic beliefs are intertwined with practices and other material arrangements" (Lounsbury, Steele, Wang, & Toubiana, 2021, p. 262). To make the case of an institutional logic of digitalization, I follow a common definition of an institutional logic as:

> the socially constructed, historical pattern of material practices, assumptions, values, beliefs, and rules by which individuals produce and reproduce their material subsistence, organize time and space, and provide meaning to their social reality. (Thornton & Ocasio, 1999, p. 804)

Digitalization certainly seems to fit the bill, arguably on an equal footing with the previously identified logics, structuring how managers and experts produce the present and future of contemporary organizations. The institutional logic of digitalization as I conceive it goes well beyond the mere algorithmic control of workers (Frenken, Vaskelainen, Fünfschilling, & Piscicelli, 2020). Digitalization represents a new societal logic that prescribes the replacement of human knowing and human routines with information flows, algorithmic calculation, and automated processes. It is a cultural system consisting of ideals, knowledge, organizational practices, identities, and material structures that conceive and enact a world that is more calculable, optimized, and adaptable. This perspective complements the prevailing efforts to understand how established institutional logics shape the development and adoption of information systems within incumbent companies (Berente, Lyytinen, Yoo, & Maurer, 2019; Burton-Jones et al., 2020; Faik et al., 2020; Qiu, Gopal, & Hann, 2017).

The institutional logic of digitalization entails several clear values and evaluation criteria that are shared at the societal level and span both the experts' practices and managerial beliefs. Many values of digitalization originate from the domain of engineering: objectivity (the ideal that evaluations should be independent of observers), modeling of task domains as abstract systems, constant measurements, modularization of tasks, and preoccupation with optimization. Over time, digitalization has become associated with the idea of instantaneous controllability of everyday reality through software, exemplified by the concept of "programmable world" and the observation that the venture capitalist Marc Andreessen famously made in 2012 that "software is eating the world." As noted above, digitalization entails deeply engrained beliefs, ideals, and stories that reinforce, legitimize, and give meaning to the various practices and identities central to the logic.

The ideals of omniscience and omnipotence noted above can be seen as generic prescriptions for numerous organizational practices central to digitalization. While these two managerial ideals have long been omnipresent (pun intended) and instrumental in leading technology companies, as evident in Amazon's early obsession with data (Stone, 2013), they are now spreading to large incumbent corporations and even government agencies. The two ideals and their related practices reinforce each other at both the field and organizational levels (Alaimo, 2021). Analyses and optimization models based on real-time digital data create lucrative opportunities to redesign business processes and implement automation.

At the same time, the ability to adapt key business processes in real time increases the value and usefulness of digital data flows and powerful optimization algorithms.

It is worth remarking that none of the individual elements in Fig. 1 can bring about the institutional logic of digitalization by itself. Technological artifacts may remail disconnected from managerial thinking and practices, acting merely as an external force outside the core culture of the organization (Kallinikos & Hasselbladh, 2009) rather than becoming intrinsic central nodes in the web of meanings, like the spurns worn on the now famous cocks (Geertz, 1972). Likewise, the skills and practices of data professionals and the new digital business models may remain compartmentalized and disconnected from the top management team and broader organizational culture. But over time, I suggest, we will see these aspects converge so that software and data objects are no longer external forces that shape field-level practices (Alaimo, 2021), but rather intrinsic to the culture. Empirical investigation and theoretical work concerning the mutually reinforces, captured by arrows in Fig. 1, represent a promising line for future research (e.g. van Rijmenam & Logue, 2021).

Digitalization and Institutional Complexity

A central stream in the institutional logics literature relates to institutional complexity and plurality (Greenwood, Raynard, Kodeih, Micelotta, & Lounsbury, 2011; Kraatz & Block, 2008), the coexistence of multiple logics with diverse prescriptions that create conflicting demands on actors. By elaborating digitalization as an institutional logic that stands in contrast to established logics in organizations, we may be able to identify key tensions in digitalization and explain why diverse institutional fields and organizations respond in specific ways to digitalization.

Although it seems preposterous to attempt to summarize complex historically accumulated cultural structures that cover whole societal domains in a few cells of a table, I have done exactly that in Table 1. I have focused on the institutional logics that I consider to be the most central to understanding how for-profit companies operate, drawing in particular on Fligstein's (1990) historical work. For example, the logics of bureaucracy, markets, and finance seem to capture in a more fine-grained manner the beliefs and practices sometimes called "the corporate logic." In any case, any discussion of institutional logics detached from specific national and industry settings provide at best crude characterizations – it seems foolish to assume there are strong commonalities rather than a mere family resemblance among instances of "bureaucracy" across the globe. Despite these reservations, I believe the table approximately captures the most significant aspects of these different logics.

As suggested by the table above, the logic of digitalization is markedly different from the older logics. For example, the logic of digitalization provides distinctive prescriptions for managing uncertainties, arguably a central concern for leadership in contemporary companies. Whereas the established logics prescribe reasserting tradition and conserving resources as solutions to uncertainty, the

Table 1. A Comparison of the Established Institutional Logics With Digitalization, Focusing on Their Effects Within Organizations.

	Digitalization	Professions	Bureaucracy	Finance	Market
Central ideals or organizing principles	Pursuit of digital omniscience and omnipotence	Loyalty and conformity toward the profession	Impersonality and predictability	Maximizing net present value	Improving market position
Root metaphor for organizations	Simulacrum	Meritocratic community	Machine	Portfolio of investments	Trader
Sources of authority and legitimacy	Analysis of real-time data	Mandate	Role in the hierarchy	Power over the allocation of capital	Relative performance in the market
Key evaluation criteria	Real-time metrics	Expertise, conformity to values	Reliability, conformity to rules	Return on investment, cost of capital	Revenue, profit margin, growth
Iconic practices	Modeling, optimization, software development	Peer-review, authoring reports and statements	Performance review, goal-setting, task allocation	Financial calculations, management accounting, investor relations	Marketing, product development, sales
Conception of employee roles	Supervising and developing automated processes	Applying expertise in relevant problem domains	Carrying out predetermined processes and policies	Carrying out the chosen investments	Identifying and meeting customer needs and demand
Coping with uncertainty	Agility in perceiving changes and reacting to them	Field-level collusion, institutional maintenance	Institutional maintenance, conforming to rules	Diversifying through new ventures, products, and investments	Developing customer understanding and minimizing costs

logic of digitalization suggests a proactive stance by prescribing agility and rapid adaptation. By capturing the reality in data and predicting outcomes (digital omniscience), companies can see through uncertainty, whereas digitalized processes allow rapid and optimal adjustments (digital omnipotence) in changing conditions.

The logic of digitalization seems to have rather complex relationships with the "incumbent" institutional logics, escaping any simplistic characterizations. Consider, for example, how digitalization both conflicts with and complements financial logic. As the logic of digitalization prioritizes generation of data as a generative resource for innovation (Nambisan et al., 2019; Thomas & Tee, 2021) that can be exploited through rich long-term customer relationships, it envisions deep interconnectedness among diverse businesses. This view is in conflict with the portfolio perspective to businesses advocated by finance, where businesses can be bought and sold, and their relative independence helps manage "portfolio risk." Indeed, while the financial logic depicts corporations as portfolios of businesses and initiatives that ought to be governed as sources of cash flows, many data-intensive companies avoid the financial approach. Due to synergies across activities around shared data and customer relationships, many technology companies, including Apple, calculate financial performance only at the level of the whole company (Isaacson, 2011). Famously, Facebook devoted little consideration to revenues, let alone profits, during its early years of rapid growth.

Yet, in other ways, the logics of digitalization and finance have seemed to blend effortlessly, giving rise to a host of new organizational practices. The calculation of customer lifetime value (CLV) and its use in decision-making represents a mixture of traditional finance (valuing customer relationship as an asset) and sophisticated data analytics where large datasets of customer behaviors are fitted to a Markov chain model (Pfeifer & Carraway, 2000). In digitalized companies, the CLV models often inform customer-related actions, such as advertising, pricing, and sales efforts, aesthetically aligning with the finance logic.

The logic of digitalization and its guiding principles are often "instantiated" in amalgamation of and compromise with competing logics. Software design that affords physicians to exert discretion over billing, as described in another paper of this volume (King, Wright, Smith, Chaudhuri, & Thompson, 2022), illustrates the hold of professional logic can slow down the instantiation of the logic of data by confounding its prescribed pursuit of digital omnipotence. When the various levels of management are committed to the new "logic of data" and able to apply this vision throughout the organization, we are likely to see a radical institutional change. Such process is well exemplified by Amazon, Facebook, and Google that have put data flows and software at the core of nearly all organizational practices. When this happens, human authority is progressively subordinated to the objectified, measured, and optimized systems that exist first and foremost in data (Baskerville, Myers, & Yoo, 2019). Alternatively, proponents of established logics, including the democratic logic, may stage concerted resistance to datafication and draw attention to its societal implications (Saifer & Dacin, 2021; Zuboff, 2019).

As humans are being replaced by software, we may see more clearly the hidden assumptions and values in the received institutional logics. Most significantly,

the digitalized pursuit of objectivity reveals the extent to which society has been built on a logic of individualized human authority, as exemplified equally by referees, judges, and umpires who rule of games, various managers who rule over organizations, and professionals who rule over the application of specialized knowledge. The logics of markets and finance emphasize the rational *Homo economicus*, while the logics of democracy, family, and religion bestow different kinds of leaders with authority. The professional logic prescribes authority firmly with the expert members of various professions. In stark contrast, the ethos in the logic of digitalization is to put data and analytics in place of human authorities, to take "hippos" (Highest Paid Person's Opinions) out of the process. In sports, for example, the logic of digitalization can be seen in the systematic efforts to replace human judges, referees, and umpires with information technology. Cameras and software are now widely applied to create an objective view of the sporting reality. Technologies actively intervene to make football, tennis, baseball, and even gymnastics more "correct," with outcomes more optimally aligned with explicit, mechanistic rules.[3] The ideals of digital omniscience and omnipotence stand in contrast with the value that established logics put on human authority and expertise.

Digitalization as a Radical Institutional Change

The institutional logic perspective helps theorize the cascading and transformative impact of digitalization that upends existing institutional orders (Hinings et al., 2018). This radical change is not brought about by technology alone. Companies also adopt new organizational practices and managerial mindsets that are inspired by technological innovations. Although research has widely recognized transformative impact of new business models, revolutionary digital products, platforms, and digital ecosystems (Nambisan et al., 2019), broad attention to the diverse cultural and structural changes within organizations is of more recent vintage (Kronblad, 2020; Raisch & Krakowski, 2021; Schneider & Sting, 2020). By attending to the diverse elements of digitalization summarized in Fig. 1, we can provide a more nuanced account that perhaps even helps predict and manage incremental or radical forms of organizational and institutional change.

As an organization invests into digital expertise and infrastructures, the potential power of algorithmic processes increases and the relative value of human intuitions and insights decrease. For example, the high-quality data that Facebook holds about its customers, an example of digital omniscience, mean that it can use software to prescribe content that will capture attention and interest. The high effectiveness of software makes human editors as arbiters of interesting content irrelevant to the company. Organizations abound with examples where the pursuit of digital omniscience and omnipotence makes the involvement of humans in routine processes absurd. While human employees are still needed, the focus of organizational practices shifts to developing new services, solving problems, and interacting with external stakeholders. Routine work tends to be systematically outsourced, either to individual entrepreneurs (chauffors for Uber) or specialized companies (content moderation for Facebook).

The material aspects of contemporary data-centric organizational practices are also central to the cascading nature of digitalization. Algorithms can instantly process large volumes of data, and their modular interfaces mean that processes can be quickly recombined to provide new services (Yoo et al., 2010). Humans, in contrast, work relatively slowly and process small volumes of rich data in creative ways. Due to these differences, the introduction of digitalized organizational practices creates strong incentives to digitalize the adjacent practices. As soon as the organization can deliver a service without any routine human interventions, the services can be offered instantaneously and often at near zero cost.

As noted above, the diffusion of new managerial norms and beliefs related to digitalization can further facilitate rapid institutional change. Data-driven approaches to management are often legitimated by their perceived objectivity and "optimality" that makes human-centric routines appear suboptimal and even irrational, a viewpoint advocated by the proponents of data-driven management (McAfee & Brynjolfsson, 2012). The algorithmic allocation of advertising dollars appears optimal, while human-driven advertising decisions appear in contrast as subjective, suboptimal, and thus less legitimate.

Finally, the successful introduction of digitalized products and services at the field level can challenge the institutionalized beliefs that have helped maintain the established management system and organizational practices. This is particularly true of the normative hold that classic management accounting and finance practices have had over business strategy. Because new data streams and digital infrastructures are both versatile and generative assets, they generate numerous yet inherently uncertain opportunities throughout the ecosystem (Nambisan et al., 2019; Yoo et al., 2010). Once the dominant "pre-digital" managerial norms and beliefs lose their hold, there is likely to be cascade of changes because the old practices become deinstitutionalized.

The systemic and cascading embrace of the new institutional logic of digitalization may help us explain the different trajectories of established corporations and younger "digital native" companies. When an organization is able to ignore established institutional logics and its leadership is committed to the new norms and beliefs of digitalization, it is unencumbered by the established ways of working, enabling it to experiment with software-based processes. Similar dynamics appear to hold for organizational fields as well. The field of digital marketing and advertising arose as a parallel structure to the established advertising world. Web marketing was able to fully embrace the logic of digitalization because it started as a harmless side show that eventually dwarfed the traditional "dataless advertising." In established fields, such as healthcare, these developments have been slow because digitalization efforts have been carried out by incumbent organizations that are governed by strong entrenched logics.

CONCLUDING REMARKS

Digitalization represents perhaps the most significant societal and economic transformation along with the climate change. The institutional theory lens can be

used to understand how the digital technologies reshape pre-digital institutional structures (Hinings et al., 2018), as many empirical studies in this volume do. Crucially, however, institutional theory can provide a more fundamental explanation for the antecedents of digitalization. It can help trace how advances in computer science, the development of digital infrastructures, and changes in managerial thinking all intertwine, and how they lead to the progressive replacement of human observations and insights with data flows, algorithmic analyses, and automation. Focusing on the four interconnected building blocks of digitalization (see Fig. 1) and their mutual linkages, future research can apply the practice-driven institutionalist lens (Smets et al., 2017) to empirically study how organization-level transformations as well as the genesis and evolution of new organizational forms, including platforms (e.g., Logue & Grimes, n.d.). By contrasting the institutional logic of digitalization with other incumbent logics (inductively elaborating on Table 1), we may be able to account for the tensions and conflicts that characterize digital transformation.

Digitalization coincides with the diminishing power of old institutional structures and may be responsible for some of the changes. The contemporary world is undergoing rapid institutional changes that force us to rethink some of our established theoretical tenets. Sennett's (2011, p. 89) observation that the conditions of personhood have changed is worth reflecting on:

> in a world bent on destroying tradition and inherited place, on affirming the possibility of making something of ourselves through our own merits, what keeps us from becoming another person?

Similarly, as digitalization erodes the value of established capabilities and enables companies to rapidly scale new practices globally, the sentiment appears relevant for organizations and organizational fields. What keeps Apple from being a payments company or Google a major travel agency? The "technology giants" have shown how visionary founders can now upend industries that have remained largely unchanged for decades, for example, it only took Facebook eight years to amass one billion users.

The cultural, cognitive, and regulatory institutions appear to be more plastic than ever before. Not only has tradition lost its appeal along with inherited place, innovation is extremely legitimate, leading to acceleration of changes that some have called "liquid modernity" (Bauman, 2000) and "new normal" (Ahlstrom et al., 2020). These developments should not be understood to represent a uniform shift toward deinstitutionalization and disenchantment; rather, they exemplify the newfound ability that actors hold in the digitalized world to rapidly assemble new institutional orders that involve material infrastructures, collective identities, and widely shared norms and understandings.

NOTES

1. One comprehensive analysis of the various digital infrastructures involved in machine learning processes was recently published by the venture capital company Andreessen Horowitz, see https://a16z.com/2020/10/15/the-emerging-architectures-for-modern-data-infrastructure/

2. https://www.nytimes.com/2011/12/06/science/larry-smarr-an-evolution-toward-a-programmable-world.html
3. https://www.nytimes.com/2019/10/10/sports/olympics/gymnastics-robot-judges.html

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