Journal of Business Research 162 (2023) 113777

Contents lists available at ScienceDirect

Journal of Business Research

journal homepage: www.elsevier.com/locate/jbusres

Digital governance: A conceptual framework and research agenda

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ARTICLE INFO

Keywords:
Algorithmic management
Artificial intelligence
Blockchain
Corporate governance
Digital governance
Digital transformation
Interorganizational governance

ABSTRACT

The rapid expansion of digital technologies has paved the way for new forms of organizing, facilitated by increased data and knowledge exchange between individuals and organizations. However, this poses major new challenges for designing effective governance mechanisms. This paper highlights the critical role of *digital governance* in facilitating digitally enabled exchange relationships. To this end, we propose a typology of analog, augmented, and automated governance modes, each associated with specific control, coordination, incentive, and trust mechanisms. Additionally, we provide a heuristic for determining the optimal governance choice via the interplay of transactivity (i.e., the contributors, connections, and consistency in an exchange network) and corresponding governance costs. Our study advances the governance literature by defining digital governance as a distinct form and outlining key governance mechanisms and choices in the digital era. Finally, we identify avenues for future research in this field.

1. Introducing digital governance

The proliferation of digital technologies has expanded the opportunities for data and knowledge exchange (Hanelt, Bohnsack, Marz, & Antunes Marante, 2021; Verhoef et al., 2021; Vial, 2019), yet it also presents new challenges for governance. Digital exchanges, such as platform-based transactions and online communities, frequently occur in large networks with numerous simultaneous interactions, pushing analog governance mechanisms such as contracts and relational norms to their limits. For instance, it would seem almost impossible to negotiate a contract for every job performed via Amazon Mechanical Turk or to establish a trust relationship for every Airbnb home stay. Thus, it is crucial to better understand the governance mechanisms and choices that meet the demands of the digital age.

To enable large-scale digital exchanges, there is increasing reliance on *digital governance*, which leverages algorithmic protocols to automate control, coordination, incentives, and trust (Hanisch, Theodosiadis, & Teixeira, 2022; Vaia, Arkhipova, & DeLone, 2022). Digital governance touches on fundamental issues of organizing, e.g., enhancing task programmability to improve process control, automating task division and allocation to facilitate coordination, conditioning incentives through dynamic inputs, and creating the transactional transparency required for trust. For example, digital governance can create verification mechanisms for transactions, e.g., oracles and consensus protocols, which are used in blockchain networks (Al-Breiki, Rehman, Salah, & Svetinovic, 2020; Zheng, Xie, Dai, Chen, & Wang, 2017). Similarly, artificial intelligence (AI)-supported analyses can enable automatic checks on accounting data and raise red flags early, thus enhancing firm monitoring (Commerford, Dennis, Joe, & Ulla, 2022; Möhlmann, Zalmanson, Henfridsson, & Gregory, 2021). These technological solutions are important precursors of new, data-driven business models that require the regulation of data ownership, storage, transfer, access, and use across individual, functional, and organizational boundaries.

We advance the debate on digital governance by developing a conceptual framework that distinguishes between analog, augmented, and automated forms of control, coordination, incentives, and trust. In particular, we show how 1) automated control no longer relies on hierarchical control but on decentralized checks-and-balances protocols; 2) automated coordination transforms bilateral agreements into omnilateral arrangements; 3) incentives transition from bureaucratic rules to cybernetic protocols that update autonomously via dynamic inputs; and 4) trust can be algorithmically enhanced by shifting from individual actors to a complete system. In addition to the poles of analog and automated governance, our model highlights augmented governance modes, which blend elements from both domains. Importantly, our

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https://doi.org/10.1016/j.jbusres.2023.113777
Received 14 July 2022; Received in revised form 13 February 2023; Accepted 16 February 2023
Available online 30 March 2023
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framework does not suggest that analog governance is completely displaced by digital governance; rather, they complement and constrain each other.

Our distinction between analog, augmented, and automated governance also informs a governance choice model that predicts the optimal governance mode as a function of transactivity and the resulting governance costs. Specifically, we predict that automated governance becomes more cost-efficient than augmented governance and, ultimately, analog governance as transactivity—defined by the number of contributors, connections, and level of exchange consistency—increases. More broadly, we facilitate a deeper understanding of the mechanisms and strategic tradeoffs governance designers and exchange participants face when establishing effective governance solutions for the digital age. We conclude with an extensive research agenda and identify opportunities to study the governance by and of algorithms.

This paper makes three important theoretical contributions. First, we provide definitional clarity regarding the concept of digital governance, a distinct form of governance that has spawned a new field of research requiring a conceptual foundation (e.g., Hanisch et al., 2022; Lumineau, Wang, & Schilke, 2021; Möhlmann et al., 2021; Vaia et al., 2022). Hence, we answer calls for an enhanced conceptual distinction of emerging digital phenomena and clarification of the extant knowledge of corresponding analog phenomena (Adner, Puranam, & Zhu, 2019). Second, we extend previous governance research by unraveling the strategic decision-making parameters and tradeoffs associated with digital governance, and we define relevant governance mechanisms associated with digital exchange that are critical in discussions of advanced system designs such as AI and blockchains (e.g., Chhillar & Aguilera, 2022; Goldsby & Hanisch, 2022). Third, our work contributes to the wider discussion on digital transformation that has gained prominence in management and organizational research (Hanelt et al., 2021; Verhoef et al., 2021; Vial, 2019) by shifting the focus from organizational processes and business models to how digital technology impacts governance.

2. Taking stock of the governance literature

The need for governance arises from the division of labor and the associated dissipation of information and control of inputs and outputs (Gulati & Singh, 1998; Puranam, Alexy, & Reitzig, 2014; Sundaramurthy & Lewis, 2003). Ultimately, it entails creating and capturing value through exchange amid competition and asymmetric information (Gnyawali & Ryan Charleton, 2018). The governance challenge involves creating mechanisms that help integrate, direct, and monitor the distributed efforts in productive exchange relationships (Dekker, 2004). To meet this challenge, exchange partners must find ways to control relevant exchange processes (e.g., allocation of resources and tasks), outcomes (e.g., generation and distribution of financial, environmental, and social value), and relationships (e.g., opportunistic behaviors) (Goold & Quinn, 1990; Sundaramurthy & Lewis, 2003). The design of control mechanisms can be complemented and substituted by appropriate coordination (Bechky & Chung, 2018; Gulati, Wohlgezogen, & Zhelyazkov, 2012), incentives (Makadok & Coff, 2009; Rutherford, Buchholtz, & Brown, 2007), and trust mechanisms (Cao & Lumineau, 2015; Westphal, 1999) to achieve desired governance benefits. Hence, governance broadly concerns the establishment of rules that help verify inputs and outputs (i.e., control mechanisms), divide and allocate tasks (i.e., coordination mechanisms), align competing interests (i.e., incentive mechanisms), and attenuate relational vulnerabilities (i.e., trust mechanisms). Fig. 1 summarizes these complementary and substitutive mechanisms that are central to the governance literature.

Governance research has identified various responses to the control, coordination, incentive, and trust challenges in transactions (Brown, Beekes, & Verhoeven, 2011; Furlotti, 2007; Hambrick, Werder, & Zajac, 2008). A first response lies in the creation of bureaucratic organizations that define and delimit transactions and provide mechanisms of hierarchical fiat and authority to improve control and coordination, set incentives, and ensure cooperation (Powell, 1990; Williamson, 1991). A second generic response involves using contracts as a means of codifying agreed-upon control, coordination, and incentive mechanisms, backed by institutional support, to enforce legal rights (Grossman & Hart, 1986; Hart & Moore, 1990; Tirole, 1999). Finally, a third response entails fostering relational bonds that emerge organically through social interdependencies and positive exchange experiences to provide a bedrock for the emergence of trust (Gulati, 1995; Uzzi, 1997). While these analog governance mechanisms are vital to organizational life and are likely to persist, emerging digital technologies present new challenges and

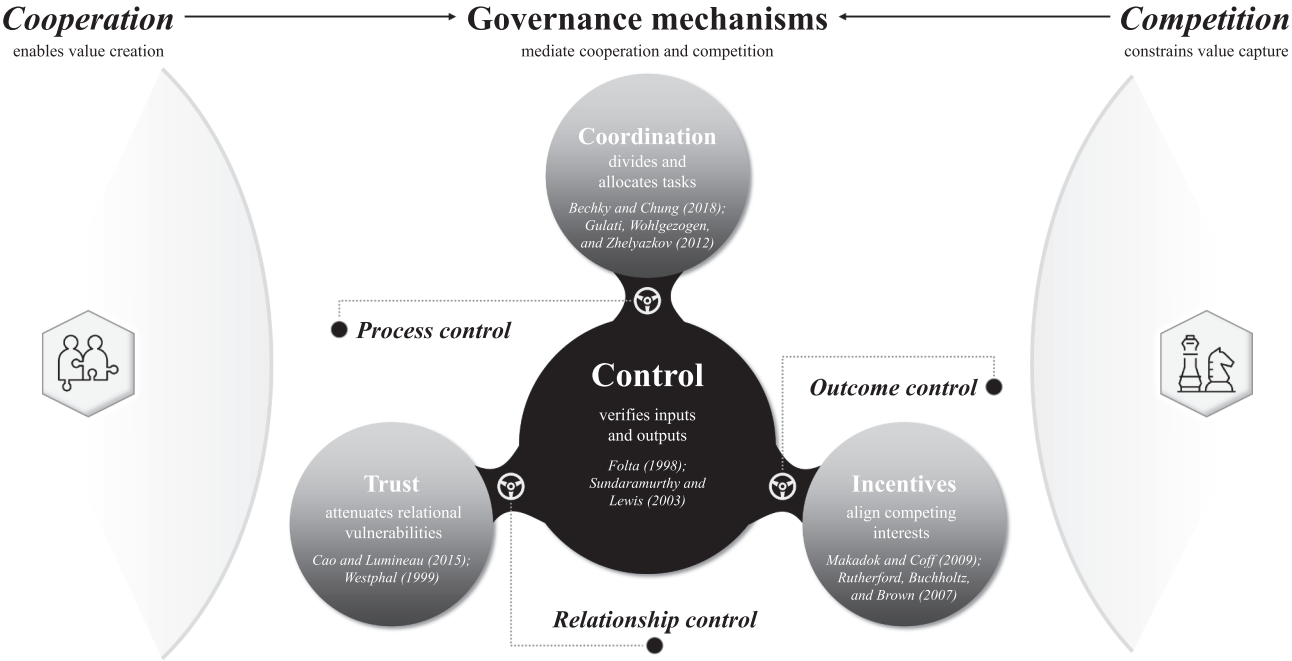


Fig. 1. Governance as a mediator between value creation and value capture.

opportunities for the design of governance mechanisms.

3. Facing governance challenges in the digital age

The need to revisit and advance governance theories in the digital age is closely linked to the novel challenges arising in this context. We examine these new challenges in terms of establishing/building, maintaining/adapting, and restoring/terminating exchange relationships. For each stage, we highlight exemplary new forms of competition and cooperation in the digital age (Fig. 2) because a critical function of governance is to enable cooperation amid competing interests.

3.1. Establishing and building digital relationships

The strategic relevance of governance results from its ability to ensure and enhance performance in exchange relationships (Jones, 1983; Leiblein, 2003). This logic is subject to a new dynamic in the digital age, where governance serves as not only a performance enabler but also a strategic differentiator. Since the value of digital networks is heavily reliant on the realization of network effects (Shapiro & Varian, 2008), companies are increasingly recognizing that their governance decisions strongly influence the overall attractiveness of their network (Chen, Tong, Tang, & Han, 2022). In light of this, Apple markets its privacy policy across the ecosystem as a strategic differentiator from its competitor Google.

As organizations have begun to compete on governance, there is also growing evidence of novel collaborative dynamics, e.g., the transparency movement concerning governance decisions via the publication and development of algorithmic protocols using open-source software code. Organizations such as OpenAI develop open-source AI to promote transparency, while decentralized autonomous organizations (DAOs) discuss algorithmic governance choices publicly in Discord forums (Taulli, 2022). These collective efforts represent new forms of collaboration largely absent from the analog world, where governance choices (e.g., contract design) have typically been negotiated behind closed doors.

3.2. Maintaining and adapting digital relationships

The transition from analog to digital governance shifts the locus of decision-making from the actors involved in the exchange to those who develop digital governance tools (Benlian et al., 2022). In the analog world, the governance mode is primarily negotiated and agreed upon by the exchange participants. However, in the digital world, decisions are often made by those who develop digital tools, disconnecting them from the parties that execute the transaction (Renwick & Gleasure, 2021). This warrants the need for stronger consideration of the governance setters and principal actors and the processes necessary for alignment. Failing to align exchange participants and governance setters can lead to serious tensions (Huber, Kude, & Dibbern, 2017), as evidenced by Epic's lawsuit against Apple over its pricing policies on the iOS platform. These tensions can also bring new forms of collaboration, such as solidarity among content creators expressing their dissatisfaction with governance decisions (Ricart, Snihur, Carrasco-Farré, & Berrone, 2020).

3.3. Restoring and terminating digital relationships

The termination of interorganizational and interpersonal relationships has been extensively studied in the context of strategic alliances (e.g., Asgari, Singh, & Mitchell, 2017; Bakker, 2016) and CEO dismissals (e.g., Marcel, Cowen, & Ballinger, 2017; Oehmichen, Schult, & Wolff, 2017). However, comparatively little is known about participants' departure in predominantly digital exchange relationships (Shah, 2006; Tiwana, 2015). This termination can be attributed to various factors, one of which is the design of governance mechanisms. Well-designed governance and increased trust between parties in platform markets can paradoxically lead to a platform's disintermediation as users seek to bypass platform fees and continue their transactions (Gu & Zhu, 2021). Governance choices regarding the interoperability of digital platforms can also raise coordination costs for developers and increase the likelihood of platform abandonment (Tiwana, 2015). Finally, the addition of non-human agents through governance choices can alienate human participants (Newlands, 2021). For instance, the use of algorithms to control information presentation on social media platforms presents challenges in designing governance mechanisms that avoid negative consequences and potential legislative interventions (Riemer & Peter, 2021). Hence, preventing activities that drive human participants away is a crucial challenge in digital governance.

In the most extreme cases when governance decisions are met with widespread resistance, a coordinated campaign can lead to mass platform exit, as Facebook experienced after the Cambridge Analytica scandal (Zhang, Wang, Karahanna, & Xu, 2022), or the concerted effort by major consumer products companies to stop advertising on Twitter over controversial policies set by new CEO Elon Musk. Thus, exchange

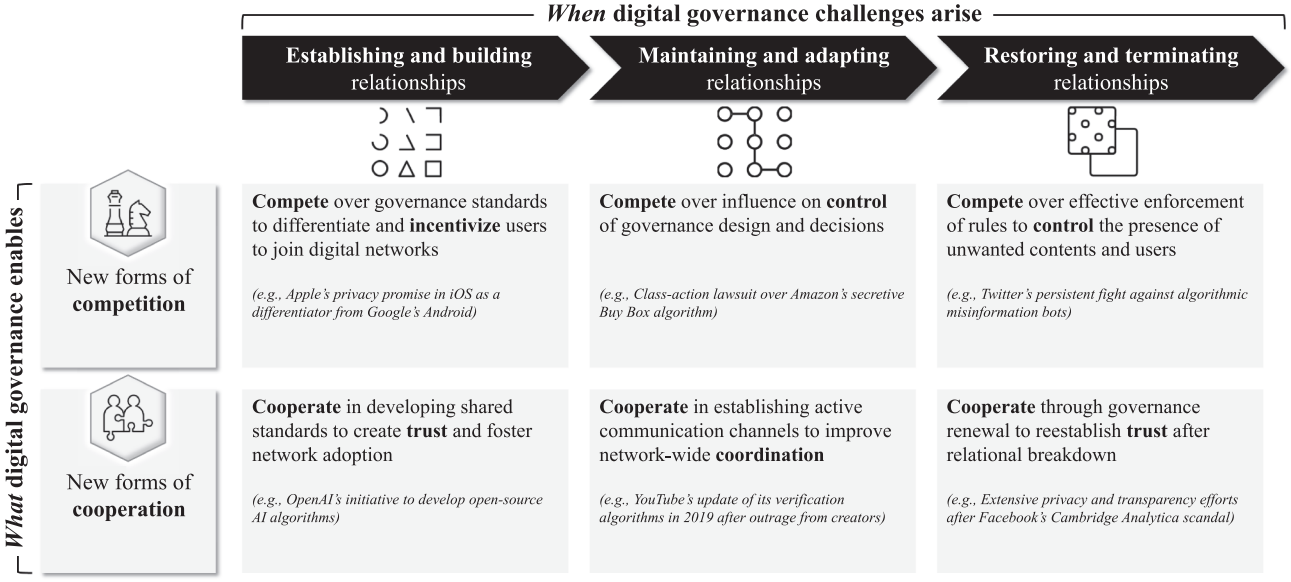


Fig. 2. Exemplary governance challenges in digital exchange relationships.

participants can pressure governance designers by employing exits as effective strategies to undermine the size and value of a network. Recognizing these novel exigencies, scholars have begun to identify and explore the mechanisms and tradeoffs of governance in digital contexts across disciplines.

4. Recognizing the potential of digital governance

Digital governance is facilitated by digital technologies, i.e., different combinations of information, communication, and other connectivity technologies (Bharadwaj, El Sawy, Pavlou, & Venkatraman, 2013). In digital governance, there is a strong focus on digital technologies that can process data relevant to value-added exchanges (e.g., advanced databases such as blockchains; Lumineau et al., 2021) and the heuristics that can make autonomous decisions to support exchange continuity (e.g., complex algorithms such as matching algorithms and AI; Malgonde, Zhang, Padmanabhan, & Limayem, 2020). Such digital technologies permit a shift toward automated modes of governance, which differ radically from their analog counterparts (Strich, Mayer, & Fiedler, 2021; Tarafdar, Page, & Marabelli, 2023). Hence, we view digital governance as a distinct governance category that sustains novel forms of organizing, value creation, and value capture, and thus goes beyond the digitization of existing analog governance mechanisms.

The extent to which digital technologies are used to govern exchanges can range from augmenting to fully automating governance (*cf.* Raisch & Krakowski, 2021). On the one hand, digital governance can *augment* aspects of governance, reducing reliance on human intervention. For example, classic exchange relationships between buyers and sellers can be augmented by digital governance in the form of digital platforms that act as intermediaries connecting buyers and sellers (Constantinides, Henfridsson, & Parker, 2018; Reuver, Sørensen, & Basole, 2018). On the other hand, technological solutions can help organizations *automate* governance. For example, algorithmic surveillance in the gig economy allows platform firms to automate control of their workforce and complementors (Bellesia, Mattarelli, & Bertolotti, 2023; Möhlmann et al., 2021; Newlands, 2021). The advantage of augmenting and/or automating governance through digital technologies is that these digital governance structures can drive efficiency (e.g., through repeat, rule-based transactions) and transparency between exchange participants (e.g., recommender systems and digital identities). Additionally, digital governance structures can have formally superimposed controls (e.g., role management and access rights) that increase certainty and reduce tolerance for erroneous transactions (e.g., through approval systems, voting rights, and rigorously programmed workflows).

Nevertheless, augmented and automated governance are often complemented and constrained by analog governance, which balances technological affordances with its strong focus on interpersonal and contractual mechanisms. For example, machine learning algorithms, while able to automate workflows such as content review processes, are prone to biases and therefore require human oversight in certain circumstances (Akter et al., 2022; Kordzadeh & Ghasemaghaei, 2022). In other cases, algorithmic governance is simply undesirable, especially in regard to assuming significant responsibilities. For instance, corporate legislation generally prohibits non-human representatives from assuming a supervisory role on the board of directors. Consequently, digital governance relies heavily on the complementary and constraining influence of analog governance to mitigate the pitfalls of fully automated governance.

One limitation of automated governance can arise when its highly programmatic nature promotes rigidity and thereby harms adaptability (Zhu, Kraemer, Gurbaxani, & Xu, 2006). A related downside is that automated governance requires explicit information, while governance may involve tacit information that are difficult to codify. Furthermore, automated governance can quickly succumb to compliance and regulation, as seen with the European Union's General Data Protection Regulation (GDPR), which strictly regulates personal data storage and may conflict with the append-only nature of blockchains (Rieger, Guggenmos, Lockl, Fridgen, & Urbach, 2019). Thus, automated governance must be carefully constrained and complemented with analog governance to overcome its shortcomings. Automated governance alone cannot be considered a cure-all solution.

To theorize about the role of analog, augmented, and automated governance mechanisms, we consider them to be interrelated and complementary. Our goal is to comprehend how digital governance can augment and automate analog governance, such as administrative procedures, contracts, and relational norms, thereby establishing digital mechanisms of control, coordination, incentives, and trust. It is crucial to emphasize that analog governance plays a significant role in complementing and constraining digital governance mechanisms where they fall short.

5. Understanding the shift from analog to automated governance

Ongoing digital transformation is leading to profound changes in the governance of exchange relationships, with analog forms of governance being supplemented and, in some cases, replaced by automated forms. Here, *analog* governance refers to instances when governance is predominantly based on *centralized* control structures, *bilateral* task coordination, *bureaucratic* incentives, and *actor-based* relational trust. In contrast, *automated* governance entails that governance is based largely on *decentralized* control, *omnilateral* coordination, automatic *("cybernetic")* incentives, and *algorithmic* system trust. Given these two extremes, an intermediate mode is *augmented* governance, where actors and algorithms intertwine. *Augmented* governance involves *distributed* control, *multilateral* coordination (assisted by digital channels), *programmatic* incentive structures, and *actorithmic* trust. Below, we elaborate on these generic governance modes (analog, augmented, and automated) and provide a comprehensive definition of the underlying four governance mechanisms—(1) control, (2) coordination, (3) incentives, and (4) trust.

Fig. 3 illustrates how each of the three governance modes manifests across the four mechanisms. When using the terms "analog," "augmented," or "automated" governance, we refer to discrete, pure sets that exist within the broad spectrum of the combinations of these endpoints of the multidimensional space we depict. In general, we view the transition between analog and automated governance as a fluid, multilevel continuum that allows decision-makers to automate certain governance mechanisms individually or in conjunction with others. Thus, it is possible to "mix and match" analog, augmented, and automated governance mechanisms in various hybrid forms of governance. For parsimony, we focus our theorizing on discrete points in the option space; however, we fully recognize the configurational logic underlying this framework (Furnari et al., 2021). Thus, in practice, we expect to observe configurations that blend analog governance (e.g., for control) forms with elements of augmented governance (e.g., for coordination) and automated governance (e.g., for incentives).

5.1. Control: from centralized to decentralized

In analog governance, control is *centralized* through contracts and fiat (Williamson, 1991). Centralized control relies on mechanisms of vertical authority and primarily focuses on behavior and outcome enforcement (Eisenhardt, 1985; Ouchi & Maguire, 1975). Outcome-based contracts formalize agreed-upon metrics, such as product sales, and behavior-based contracts improve adherence to performance-related metrics, such as task completion time. Both types of contracts are typically supported by vertical authority mechanisms, such as hierarchical fiat and institutional power, to enforce outcomes or behaviors.

Automated governance in the form of *decentralized* controls replaces vertical authority with autonomous algorithms that improve outcome

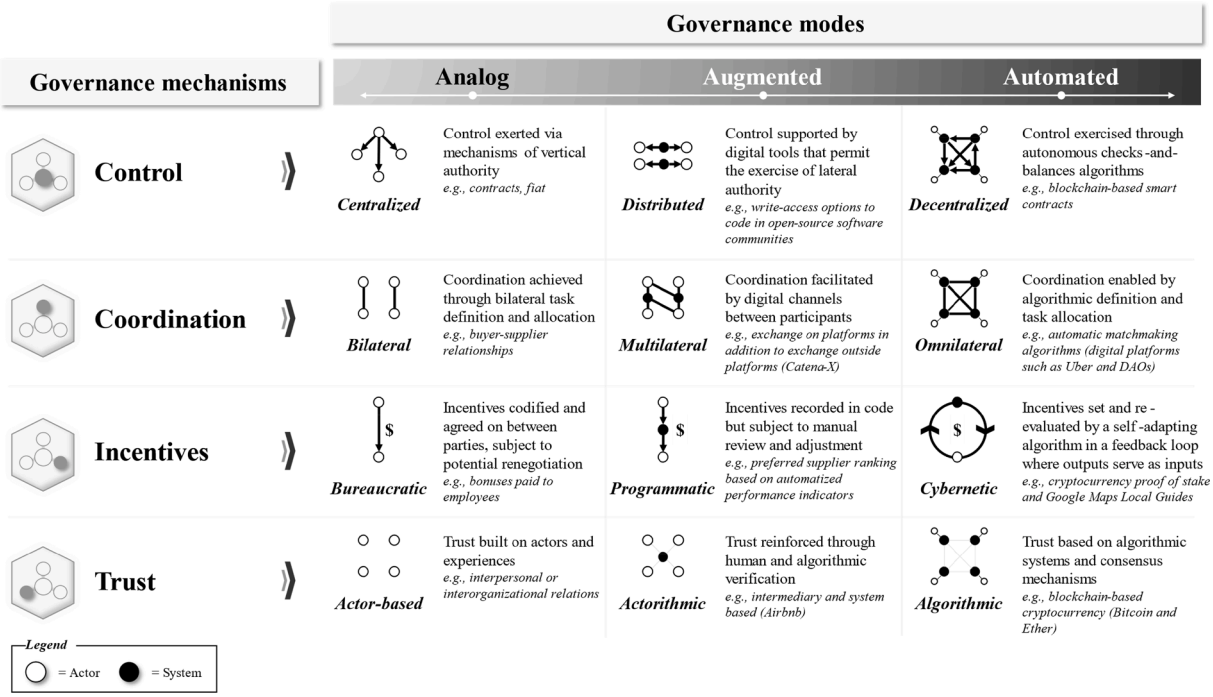


Fig. 3. Configurational building blocks of governance mechanisms and modes.

certainty and enforce rigid behavioral control. These algorithms can be used to monitor a workforce (e.g., Amazon's fully automated warehouses; Baraniuk, 2015) or user-generated content in social networks (e.g., Gilbert, 2021). Decentralized control systems have several advantages, such as following preprogrammed rules that are automatically executed (e.g., through smart contracts) and not requiring enforcement by vertical authority (Murray, Kuban, Josefy, & Anderson, 2021). Additionally, they structure a checks-and-balances system that increases certainty through transaction and information validation by each participant in the control structure. Furthermore, decentralized information systems, such as blockchains, can digitize routinized workflows, providing stricter process control and increasing behavioral certainty.

In addition to centralized and decentralized control, digital tools can enable the emergence of *distributed* control mechanisms. Distributed control is a form of control that operates through lateral authority and is enabled by digital tools. For example, open-source software development relies on distributed controls among developers that regulate access to read, write, or contribute code (Dahlander & O'Mahony, 2011). This type of control is anchored in the developer community and digital tools such as GitHub or Bitbucket. The advantage of distributed control is that it gives partial control over bureaucratic tasks, such as version control, to an automated and decentralized system while accounting for contingencies beyond the program code.

5.2. Coordination: from bilateral to omnilateral

In the analog context, coordination occurs *bilaterally*, which means that an actor divides labor into tasks that can be assigned to and performed by another party, as would be the case in buyer–supplier relationships (Jones, 1984). One benefit of this type of coordination is that task assignments are usually routinized, leading to increased reliability and efficiency in organizational performance (Cohen & Bacdayan, 1994). However, this type of procedural memory can also be inarticulate and challenging to transfer between actors.

In contrast, *omnilateral* coordination relies on mechanisms where a system divides labor into tasks that can be assigned to any party automatically. Importantly, omnilateral mechanisms do not rely on implicit procedural memory but on rigid task codification, division, and assignment, which are fully autonomous. For instance, platform firms such as Uber, Lyft, Deliveroo, and GrubHub extensively adopt algorithmic coordination to manage task allocation, goal setting, and scheduling for their workforce (Tarafdar, Page, & Marabelli, 2023). Another example of omnilateral coordination concerns DAOs, whose first use cases (e.g., MakerDAO, a stablecoin issuance platform) illustrate how fully autonomous task division and task allocation occur through on-chain voting (Zhao, Ai, Lai, Luo, & Benitez, 2022). As routines are considered dynamic (Feldman, 2000), a risk of any omnilateral coordination is that its assisting algorithm does not persist over time and cannot account for possible changes in the organization's task environment, which can impede overall task division and assignment.

Between the extremes of bi- and omnilateral coordination mechanisms, coordination can take an augmented form of *multilateral* coordination where tasks are divided and assigned by physical actors through digital channels. The advantage of multilateral coordination is that digital channels partly codify routines that would otherwise be stored in procedural memory. For example, the Catena-X network, which fosters cross-company data exchange in the automotive industry, relies on an open data ecosystem where parties use network services to share data and on an actor-based consortium to coordinate its development. Simultaneously, with multilateral coordination, direct actor involvement helps account for salient routine instability (Pentland, Hærem, & Hillison, 2011). Using multilateral coordination through digital channels, parties can better anticipate when a change in routine is required and whether a bypass of automatic task division and allocation is warranted.

5.3. Incentives: from bureaucratic to cybernetic

In the analog world, incentives are *bureaucratic* in the sense that they are set in contracts that align the objectives of the partners, such as explicit compensation arrangements between owners and managers (Oehmichen, Jacobey, & Wolff, 2020). Incentives are important

complements to controls; they can help reduce conflicts between parties, e.g., agency problems due to the separation of decision- and risk-bearing functions (Fama & Jensen, 1983). In their bureaucratic form, incentives are agreed upon by parties and subject to potential renegotiations. For example, when a bonus is paid to an employee, this is an incentive that rewards the employee with variable compensation that is typically agreed upon contractually (Shaw, Gupta, & Delery, 2000).

Bureaucratic mechanisms differ sharply from *cybernetic* incentives, which are set and re-evaluated by a self-adapting algorithm in a feedback loop where outputs continuously serve as inputs (Green & Welsh, 1988; Vergne, 2020). For example, an increasingly popular cybernetic incentive mechanism is "proof-of-stake" rewards in cryptocurrencies. Here, network participants serve as "validators" by staking their cryptocurrencies or tokens for a set period, which is documented in a smart contract on the blockchain (Edelman, 2022). In return, when participants validate new block transactions, they are rewarded for their validation efforts with cryptocurrency. Another example of a cybernetic incentive is Google Maps Local Guides; contributors to Google Maps who share reviews, photos, and knowledge are rewarded with points, which can be exchanged for rewards or used in exclusive community events (Tajedin, Madhok, & Keyhani, 2019). Underlying these cybernetic incentive systems are algorithms that automatically distribute and adjust rewards when certain input conditions (e.g., price levels, demand) are achieved.

In addition to the range of bureaucratic and cybernetic incentives, *programmatic* incentive structures that are recorded in code but subject to manual review and adjustment could become the norm. In contrast to cybernetic incentives, programmatic incentives are predefined, rigid, and automatized rules that do not work in a constant feedback loop. An example of programmatic incentives is preferred supplier programs: Sourceability, a global distributor of electronic components, has developed an automatized supplier rating system that scores each supplier and prefers high-quality, timely suppliers, incentivizing suppliers through the communication of rank order and related order placement.

5.4. Trust: from actor-based to algorithmic

In the analog world, trust is *actor-based* and describes the expectation that an exchange partner will not behave opportunistically, even when the affected party has limited abilities to detect such behavior (Mayer, Davis, & Schoorman, 1995; Puranam & Vanneste, 2009). In interorganizational collaboration, trust can be built between partners that engage with each other repeatedly, where each delivers the outcomes expected of the other, and where each entity behaves responsibly toward the other, which can ultimately build trust in competence and goodwill (Das & Teng, 2001; Gulati, 1995).

In automated contexts, trust resides in the *algorithmic* system itself and is not dependent on personal relationships (Lumineau, Schilke, & Wang, 2023). Rather than relying on the (unobservable) actions of partially known exchange partners, trust can be placed in a system that automatically validates each party without having to reveal its identity. For example, cryptocurrencies, such as Bitcoin and Ether, rely fully on transactions based on automated consensus mechanisms, eliminating the need for trusted intermediaries to help safeguard against opportunistic behavior (Seidel, 2018; Werbach, 2018). In enterprise applications, blockchain technologies such as IBM Food Trust enable information in the food sector to be stored on an immutable blockchain, allowing customers to track their entire value chain while increasing confidence in the product's provenance and quality (IBM, 2022). Trust in the system, rather than in the actors, is particularly crucial in digital exchange (Ba & Pavlou, 2002).

Along the spectrum of actor- and system-based trust, an augmented mode of trust can emerge as a principal form that is *actorithmic* in nature, where actor-based trust is algorithmically enhanced. In other words, actorithmic governance emerges when trust depends partly on the actions of the parties involved in an exchange and partly on digital technologies. Actorithmic governance is evident in digital marketplaces and platforms such as eBay and Airbnb, where trust between unacquainted transaction parties is partially established through the parties fulfilling their agreements and partially through digital technologies. The necessary trust building is facilitated by the recommender systems of these platforms, which assess parties based on their transaction performance, combining human evaluation with automated ranking systems (Malgonde et al., 2020).

5.5. Combining analog, augmented, and automated governance forms

Governance designers can blend control, coordination, incentives, and trust mechanisms from analog, augmented, and automated governance to create new governance configurations that can be gradually implemented. In many organizational settings, some governance mechanisms are analog, while others are augmented or automated. As an illustration, the Linux kernel development community utilizes a combination of analog and augmented governance. Control is augmented through write access granted solely to maintainers (authorized developers) who formally approve patches reviewed by the community. Coordination is facilitated through digital mailing lists. Incentives are augmented by a repository that stores version copies and developer names, allowing for credit attribution. Finally, trust is placed in "trusted lieutenants," who work closely with founder Linus Torvalds (Lee & Cole, 2003). Another example that leans more strongly toward automation are DAOs, where control is automated through voting rights and code-embedded rules; coordination is augmented with digital tools such as Discord; incentives are automatically distributed through consensus mechanisms and smart contracts; and trust is fully automated using blockchain technology (Hsieh & Vergne, 2023; Kaal, 2021). This combinatory power of digital governance enables designers to experiment with various configurations before making a commitment or opting for partial automation of governance.

Notably, governance choices are dynamic and adaptable. In fact, each of the four governance mechanisms may experience a dynamic development; a shift from analog to automated ways of governing exchanges, or vice versa. However, it is unlikely that automated forms of governance will emerge as the only dominant form. Rather, the dominant governance mode may gradually stabilize in augmented forms of governance, where analog and digital forms overlap and fill each other's voids. In the next section, we describe a heuristic for determining when analog, augmented, or automated forms of governance are best suited for exchange.

6. Making the right governance choice

An important consideration when evaluating governance choices concerns the associated governance costs of designing, implementing, and adapting the necessary control, coordination, incentive, and trust mechanisms. Each of the three focal governance modes (analog, augmented, and automated) generates specific costs. From an efficiency perspective, the governance choice should provide the desired benefits at the lowest possible cost.

6.1. A governance choice framework for the digital age

A core tenet of transaction cost economics is that transactional attributes, particularly the "bilateral dependency [that] builds up as asset specificity deepens" (Williamson, 1991, p. 282), determine governance choices. However, this argument requires serious reconsideration in the digital age, where exchanges often occur between *multiple* parties simultaneously, the primacy of assets gives way to *digital data*, and reliance on institutional enforcement is supplanted by *algorithmic* rules. Moreover, digital exchanges often occur outside the spectrum of markets and hierarchies, generating new forms of organizing as in blockchains, digital platforms, and online communities (e.g., Benkler, 2002; Puranam

et al., 2014). We are interested in an extension of the classical governance choice model, taking into account augmented and automated forms of governance in addition to the analog form. Our objective is to incorporate a discriminant logic that explains when and why each form of governance is selected.

To better explain digital governance choices, we introduce the notion of *transactivity*—a composite construct that encompasses the overall extent of contributors (i.e., participants), connections (i.e., relationships), and consistency (i.e., flows) in an exchange network. In network terminology, the first element concerns network size (i.e., number of nodes) and the second concerns network density (i.e., realized connections between nodes), two important network governance determinants (Provan & Kenis, 2007). The third element, consistency, indicates whether exchanges occur in a standardizable or homogeneous manner rather than a customized or idiosyncratic fashion. Notably, a linear increase in the number of contributors (i.e., network size) can induce exponential growth in the number of connections (i.e., network density), which puts particular strain on any analog governance design. In contrast, consistency acts as a critical boundary condition for the scalability of any automated governance solution; algorithmic solutions require predictability and reliability for seamless execution.

Since the three elements that constitute transactivity strongly interact with each other, very high transactivity values occur when all three elements take on high values. However, low transactivity values can occur if only one element has low values while the others have high values. This would apply to a large network (e.g., hundreds of members) with low connectivity (e.g., a density of ten percent) and high consistency (e.g., all exchanges are similar in nature). In this setting, most interactions occur on a bilateral basis with little external exchange interdependency, fostering a dispersed network structure that reduces the need for a unified and integrated governance solution. In formal terms, the multiplicative nature of the interrelationship between these three elements can be expressed as follows:

$$transactivity = \text{contributors} \times \text{connections} \times \text{consistency}$$

We expect the costs of each governance alternative (analog, augmented, and automated) to increase exponentially as a function of transactivity but at different rates. Analog governance mechanisms are particularly cost-effective for low transactivity as the necessary arrangements can or must be negotiated bilaterally, taking into account specific transactional attributes. Here, the parties select a combination of transaction-specific relational and contractual agreements, as is the case with strategic alliances or mergers and acquisitions. However, the costs of analog governance become particularly punitive as transactivity increases because the number of agreements to be negotiated increases at an exponential rate.

In contrast, for automated governance, the setup costs tend to be much higher than analog solutions because the required algorithms are expensive to design, implement, and adjust (Rimba et al., 2020; Zhu et al., 2006). However, they become comparatively low when they can be spread across a large number and volume of similar exchanges because digital solutions can be scaled at low marginal costs. Therefore, automated governance solutions have a relative cost advantage over analog governance options in settings with high transactivity, as is the case with many financial transactions, standardized service contracts, and small purchase agreements involving many parties.

Finally, the augmented governance solution falls between the two extremes; it incurs costs on both the analog and algorithmic sides. Augmented governance involves the combination of analog and augmented governance solutions. The associated costs tend to be comparatively low at medium levels of transactivity, which might be the case in small, high-density networks where some customization is required but many exchange attributes are standardized, e.g., a supply chain network where certain facets require specific relational and contractual governance (such as discussing product specifications and agreeing on relationship scope), but many aspects can be transferred to fully automated solutions (e.g., delivery, pricing, and orders). In Fig. 4, we illustrate the general logic underlying the relationship between transactivity (horizontal axis) and governance costs (vertical axis) as well as the resultant governance choice.[1]

6.2. A contingency perspective on the benefits and costs of digital governance

Our analysis has focused primarily on governance costs, but in practice, it is important to weigh a complex set of costs and benefits for different stakeholders, particularly governance designers and exchange participants. For governance designers, the toolbox of automated governance offers many benefits, such as better insight into user behavior, improved unwanted action monitoring, and greater efficiency, especially in scaling operations (Benlian et al., 2022). Such benefits are offset by significant upfront costs when designing, implementing, and adapting automated governance solutions, which can hinder their deployment for small-scale transactions. Hence, organizational characteristics may play an important contingency role; smaller organizations may lack requisite funds for designing and implementing automated governance modes. Moreover, lawmakers worldwide are increasing pressure, demanding greater accountability for online activities (e.g., fake news and illegal activity) and putting bounds on the use of governing algorithms (e.g., the AI Act in the European Union).

While focusing on the governance designer's perspective is reasonable for analytical purposes, the exchange participants may have a different perception of the costs and benefits of digital governance. For participants, automated governance offers many promises, such as increased predictability through technologies such as smart contracts, improved inclusivity due to the low barriers to participation in the digital economy, and a high level of reliability in conducting transactions based on transparent rules (Santana & Albareda, 2022). Nevertheless, automated governance solutions can also be abused, leading to a loss of autonomy through surveillance, a sense of voicelessness amid

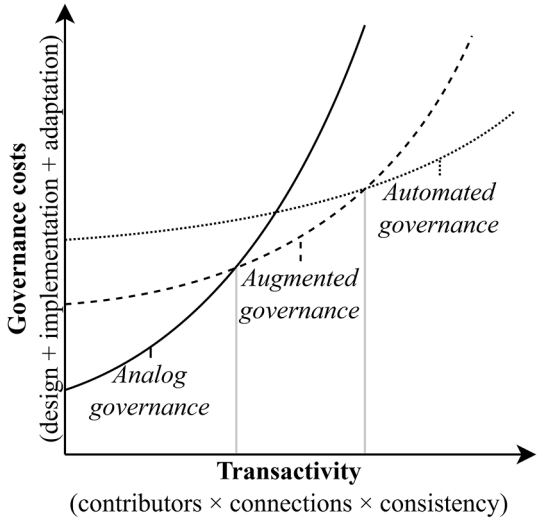


Fig. 4. Governance choice framework.

[1] Augmented governance often permits a transition from analog to automated governance and allows certain governance voids within each pure governance mode to be filled. For example, when programmatic errors or cyberattacks undermine algorithmic protocols, analog governance mechanisms can provide valuable contingency plans and help restore the system. Thus, regarding these potential cost inefficiencies entailed by a combination of governance modes, the benefits of redundancy and associated system stability may outweigh them.

quasi-monopolistic digital incumbents, and dependencies on specific services with high switching costs (e.g., Möhlmann, Alves de Lima Salge, & Marabelli, 2023). Network effects introduce another contingency for participants, wherein they may be coerced into accepting certain governance modes due to peer pressure, while the simultaneous increase in switching costs and pull effect exerted by the network further amplifies this pressure. In Table 1, we provide an overview of some of the key benefits and limitations of digital governance from the perspectives of governance designers and exchange participants. We also elaborate on these issues below in our future research agenda.

7. Developing a research agenda on digital governance

We propose a research agenda with two avenues through which scholars can deepen and broaden their understanding of digital governance. The first avenue adds to our focal discussion and highlights the governance challenges posed by digital technologies (governance *by* algorithms). The second avenue extends our discussion and addresses the accountability of digital governance (governance *of* algorithms). Table 2 provides a summary of these future research opportunities and key research questions.

7.1. Avenue 1: governance by algorithms

Our study underscores the nature of digital governance, a shift toward using digital technologies to provide automated mechanisms of control, coordination, incentives, and trust. Consistent with findings on other digital technology-driven phenomena such as digital transformation (Hanelt et al., 2021; Verhoef et al., 2021; Vial, 2019), important questions arise regarding the broader implications of such technological changes. While algorithms enable the control of numerous participants and foster perceived fairness and impartiality within organizations (Dolata, Feuerriegel, & Schwabe, 2022; Fu, Aseri, Singh, & Srinivasan, 2022), their use also promotes rigid standardization and the risk of losing sight of the social side of organizations, e.g., human cognition and emotion (e.g., Massey, 2002). Thus, insights into the cognitive, emotional, and organizational processes that accompany the introduction of digital governance are needed.

Cognition and emotions. The use of digital governance raises concerns about the role of "soft factors" such as emotions (e.g., enthusiasm or frustration) and perceptions (e.g., valuation or sensemaking), and whether people are comfortable being monitored, controlled, and potentially challenged by algorithms. Previous research highlights the impact of technology on customer emotions and discomfort, suggesting the importance of emotions in digital interactions (Holthöwer & van Doorn, 2022). The use of algorithms can also result in frustration when they challenge human intuition and compromise accountability in the workplace (Allen & Choudhury, 2022; Lebovitz, Lifshitz-Assaf, & Levina, 2022). These examples illustrate the need to consider the impact of digital governance on human emotions and perceptions to ensure its effective and responsible use.

The role of fairness in determining people's compliance with algorithmic solutions highlights the importance of a sociotechnical perspective in evaluating the interplay between technology and society (Dolata et al., 2022; Lee, 2018). Research has shown that individuals engage in complex sensemaking processes to interpret algorithms and their perceived fairness, and optimize their behavior based on incentives set by the algorithms, leading to widespread behavioral adaptation (Bellesia et al., 2023; Cameron & Rahman, 2022; Möhlmann et al., 2023). In light of the behavioral changes that may accompany the deployment of digital governance, it is crucial for further research to investigate the broader societal consequences of digital governance from both a research and a policy perspective (Lamy et al., 2022).

Standardization and biases. While some arguments suggest that more technology and governance produce linear benefits, marginal returns could decrease over time due to increasing technological saturation (Karr-Wisniewski & Lu, 2010). Therefore, digital governance implementation evokes fundamental discussions in the management literature when increasing formalization is beneficial or harmful to organizations (Walsh & Dewar, 1987). Further research is needed to determine whether digital governance promotes increasing "hyperbureaucratic" organizations where every step is mapped digitally. Consequently, hyperbureaucracy may hinder creativity and innovation in such ventures, negatively impacting organizational performance (Adler & Borys, 1996; Pesch, Endres, & Bouncken, 2021). Furthermore, digital technologies can create barriers between an organization and its customers. For example, research on chatbots (which are based on algorithms and AI) as mediators in customer interactions shows that technology can effectively serve as a barrier, impacting customer satisfaction (Crolic, Thomaz, Hadi, & Stephen, 2022).

A particularly critical issue is built-in biases in the algorithms (Akter et al., 2022). Research has provided disturbing evidence of how machine learning algorithms, if not carefully trained, can reinforce and proliferate malicious gender and racial stereotypes (Hundt, Agnew, Zeng, Kacianka, & Gombolay, 2022). Future research should therefore deepen our knowledge of how organizations can use digital governance to counter biases and ensure safe and inclusive digital environments (see Bolukbasi, Chang, Zou, Saligrama, & Kalai, 2016 for an example of a gender debiasing algorithm). This also applies to the risk of misinformation triggered by algorithmic systems: The OpenAI-developed chatbot, ChatGPT, was banned from Stack Overflow and faced restrictions on being listed as an author by academic publishers due to concerns about its potential for producing incorrect answers (Sample, 2023; Vincent, 2022).

Contingency and boundary factors. Finally, the contingency and boundary factors of digital governance require elaboration (see our discussion of Fig. 4). Research suggests that organizational characteristics, such as the size of the company (i.e., large incumbent vs. small to medium enterprise), can significantly impact the adoption of digital technologies (Fabian, Dong, Broekhuizen, & Verhoef, 2023). Furthermore, contingency aspects concern the normative question of whether

Table 1
Benefits and costs of digital governance for designers and participants.

		***How* digital governance impacts**	
		Benefits	*Costs*
***Whom* digital governance impacts**	*Governance designers*	• **Insight:** e.g., behavioral data analytics in real time, latent pattern analysis • **Oversight:** e.g., automated fraud detection, transparent operational data • **Efficiency:** e.g., low costs per transaction, easy scalability	• **Design:** e.g., programming efforts, testing algorithms • **Implementation:** e.g., infrastructure set-up, conversion of IT systems • **Adaptation:** e.g., bug corrections, feature updates
	Exchange participants	• **Predictability:** e.g., clarity of incentive mechanisms • **Inclusivity:** e.g., opportunities for individuals to contribute economically • **Reliability:** e.g., high standardization, clear if-then conditions	• **Policing:** e.g., loss of autonomy, surveillance of behavior • **Impotence:** e.g., lack of influence on governance decisions • **Dependence:** e.g., lock-in effects due to peer pressure and network effects

companies should embrace the further digitization of their governance. For instance, Griesbach, Reich, Elliott-Negri, and Milkman (2019) uncover irritating forms of "algorithmic despotism" in food delivery platforms where algorithms essentially dictate coworkers' schedules and activities. Worth keeping in mind is that the motivation for adopting digital governance is not only a firm-internal consideration but may also be influenced by interorganizational ties (e.g., supply chain interdependencies) and the institutional environment (Aguilera & Jackson, 2003; Oehmichen, Schrapp, & Wolff, 2017). Understanding organizational embeddedness, such as through regulations, cooperative, and competitive dynamics, can help explain variance in digital governance adoption. For instance, digital governance may be adopted due to mimetic pressures and because it has already been adopted by other firms (Mithas, Tafti, & Mitchell, 2013; Wang, 2010).

7.2. Avenue 2: governance of algorithms

In addition to recognizing the potential of automation, digital governance necessitates discussion of responsibility and accountability, affirming our second research avenue concerning the governance *of* algorithms (Haenlein, Huang, & Kaplan, 2022; Haenlein & Kaplan, 2021; Kaplan & Haenlein, 2020; Loebbecke & Picot, 2015; Martin, 2019). Insights into who designs algorithms and oversees the parameters of digital governance are important (see Chhillar & Aguilera, 2022 for a review in the AI context). While this issue is important from a societal perspective, it also involves legal considerations as long as the algorithms are not considered legal entities that can be held accountable for their actions (Drummer & Neumann, 2020). Moreover, from a legal perspective, it is critical for policymakers to understand the implications of digital governance and its potentially detrimental effects on society. Finally, the shift toward algorithmic and internet-based technologies also has implications for cybersecurity and how organizations can protect themselves against cyberthreats.

Design and responsibility. The definition of responsibilities for the design and consequences of digital governance remains a largely unexplored area. The impact of ambiguous responsibilities is exemplified in the Bitcoin protocol, kickstarted by Satoshi Nakamoto, who remains anonymous and cannot be held accountable for the abundance of illegal activities that this cryptocurrency enables (Foley, Karlsen, & Putniņš, 2019). From a corporate point of view, the question arises whether digital governance should be viewed as a technical matter for IT departments or whether it requires the involvement of top management, such as the Chief Digital Officer (Firk, Hanelt, Oehmichen, & Wolff, 2021). In addition to new roles such as the CDO, specific expertise can play a role, such as how the digital expertise of managers and board members influences the development and use of algorithms (Fabian et al., 2022). The shift toward algorithmic modes of management also presents opportunities for exploring the cognitive capabilities of managers (Helfat & Peteraf, 2015) because using automated governance technologies requires a new set of skills to effectively utilize them. From an alliance perspective, further research is needed on how to govern collaboration with algorithm providers such as AI startups (Oehmichen, Schult, & Dong, 2023) and AI-as-a-service providers (Zapadka, Hanelt, Firk, & Oehmichen, 2020).

Accountability and regulation. With the advent of digital governance, the question of control is critical for organizations (Kellogg, Valentine, & Christin, 2020). If algorithms lead to adverse consequences in established organizations (e.g., discrimination), who ultimately bears responsibility for them? If the shift toward decentralized and transparent blockchain-based systems continues, how can actors within such

Table 2
Summary of future research opportunities in digital governance.

Governance by Algorithms	*Cognition and emotions*	▪ Does digital governance lead to a "switching off" mentality (similar to a loss of orientation due to using Google Maps), and if so, how can it be prevented? ▪ When do digital governance mechanisms harm vigilance? ▪ When and why does digital governance affect human emotions, either positively (e.g., empowerment, trust, and confidence) or negatively (e.g., fear, frustration, and helplessness)? ▪ How can digital connections and identities strengthen or weaken relational ties between network participants?
	Standardization and biases	▪ How can organizations reap the benefits of digital governance (e.g., efficiency and standardization) while minimizing its costs (e.g., rigidity and technological dependencies)? ▪ Are organizations losing their "human touch" as a result of increasing digital governance? ▪ What are the limits of digital control and programmability of (inter)organizational processes? ▪ How does digital control influence social and creative tasks in organizations, e.g., the formation of friendships and innovation activities?
	Contingency and boundary factors	▪ When is augmented and automated governance superior to analog governance and vice versa? ▪ How can digital technologies enable forms of process controls that relieve the oversight role of managers? ▪ What is the optimal balance between digital and analog governance? ▪ When do the costs of digital governance outweigh its benefits, and when is "no governance" a better solution?
Governance of Algorithms	*Design and responsibility*	▪ Where do organizations locate the responsibility for designing (e.g., setting the parameters) digital governance mechanisms (e.g., internal development vs. outsourcing)? What are the decision parameters? ▪ Who takes responsibility and checks for biases and technical errors in technical governance solutions? ▪ How can consensus mechanisms be designed to provide security and effective dispute resolution? ▪ When should analog governance complement and constrain automated governance?
	Accountability and regulation	▪ Should policymakers actively regulate digital governance?Should digital board members and auditing firms (e.g., AI-based accounting controls and blockchain-based transparency mechanisms) ▪ be allowed, and if so, when? ▪ With whom and under what circumstances should the algorithms and data underlying governance decisions be shared or even made public? ▪ How can digital governance mechanisms contribute to or prevent antitrust problems? ▪ In large digital networks where pseudonymity prevails, who is responsible for illegal activities, biased decision-making, and technical errors?
	Cybersecurity and risk	▪ How can companies increase their resilience against malicious attacks and hacking? ▪ How can cybersecurity become a strategic issue? ▪ How can companies maintain their strategic autonomy as digital technologies require ever more expertise, which often resides outside the organization? ▪ How can companies secure their critical infrastructures amid increasing data integration and processes?

systems be held accountable, especially if online and legal entities remain separate (Sun Yin, Langenheldt, Harlev, Mukkamala, & Vatrapu, 2019; Tumasjan, 2021)? These questions suggest that digital governance presents macrolevel challenges that are relevant for policymakers (Nambisan, Wright, & Feldman, 2019). If governance is increasingly becoming more automated, what policies should be designed to protect network participants and how? How can algorithms be designed to comply with national and supranational regulations such as those enacted by the European Union? Interestingly, many large technology firms are calling for regulation at the national and supranational levels (Bajarin, 2020; Feloni, 2018; Knight, 2019), raising the intriguing question of whether these digital incumbents are truly interested in ethical digital governance or whether they are primarily trying to devolve responsibility.

Cybersecurity and risk. As organizational processes and decision-making are increasingly reliant on algorithmic protocols, the supporting infrastructure has become an attractive target for malicious attacks that compromise the operations of an organization and sensitive data (Angst, Block, D'Arcy, & Kelley, 2017). For example, the cloud company Akamai reported the largest DDoS attack ever launched against a European customer—an aggressive attempt to cripple the operations of the business (Sparling, 2022). Given such vulnerabilities, companies are called upon to develop appropriate security measures to protect their IT infrastructure from them, entailing critical tradeoffs between a higher level of automation, which enables greater efficiency, and vulnerability to cyberattacks, which can cause severe reputational damage (Triche & Walden, 2018). With the rise in digital governance and the growing importance of data, cybersecurity is becoming a strategic issue for organizations, requiring careful consideration not only to prevent malicious attacks, but also to avoid reputational damage.

8. Conclusions

In this paper, we provide a new perspective on governance in the digital age. As organizations are coalescing into ever-larger value networks, we argue that governance mechanisms for mitigating the tension between cooperation and competition between different exchange participants in digital environments are crucial. Our research emphasizes the critical importance of regulating control, coordination, incentives, and trust in ways that enable new forms of organizing, value creation, and value capture. Hence, we define digital governance as one of the long-term cornerstones of management in the digital age.

CRediT authorship contribution statement

Marvin Hanisch: Writing – review & editing, Writing – original draft, Conceptualization. **Curtis M. Goldsby:** Writing – review & editing, Writing – original draft, Conceptualization. **Nicolai E. Fabian:** Writing – review & editing, Writing – original draft, Conceptualization. **Jana Oehmichen:** Writing – review & editing, Writing – original draft, Conceptualization.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Acknowledgments

The authors would like to express their sincere gratitude to the editor, Arnd Vomberg, for his valuable insights and constructive feedback throughout the review process. We would also like to extend our thanks to the two anonymous reviewers for their thoughtful comments, which helped improve the quality of the paper. Their contributions are greatly appreciated.

Appendix A. Summary table of key concepts with examples

Supplementary data to this article can be found online at https://doi.org/10.1016/j.jbusres.2023.113777.

References

Adler, P. S., & Borys, B. (1996). Two Types of Bureaucracy: Enabling and Coercive. *Administrative Science Quarterly, 41*(1), 61–89. https://doi.org/10.2307/2393986

Adner, R., Puranam, P., & Zhu, F. (2019). What Is Different About Digital Strategy? From Quantitative to Qualitative Change. *Strategy Science, 4*(4), 253–261. https://doi.org/10.1287/stsc.2019.0099

Aguilera, R. V., & Jackson, G. (2003). The Cross-national Diversity of Corporate Governance: Dimensions and Determinants. *Academy of Management Review, 28*(3), 447–465. https://doi.org/10.5465/amr.2003.10196772

Akter, S., Dwivedi, Y. K., Sajib, S., Biswas, K., Bandara, R. J., & Michael, K. (2022). Algorithmic Bias in Machine Learning-based Marketing Models. *Journal of Business Research, 144*, 201–216. https://doi.org/10.1016/j.jbusres.2022.01.083

Al-Breiki, H., Rehman, M. H. U., Salah, K., & Svetinovic, D. (2020). Trustworthy Blockchain Oracles: Review, Comparison, and Open Research Challenges. *IEEE Access, 8*, 85675–85685. https://doi.org/10.1109/ACCESS.2020.2992698

Allen, R., & Choudhury, P. (2022). Algorithm-Augmented Work and Domain Experience: The Countervailing Forces of Ability and Aversion. *Organization Science, 33*(1), 149–169. https://doi.org/10.1287/orsc.2021.1554

Angst, C. M., Block, E. S., D'Arcy, J., & Kelley, K. (2017). When Do IT Security Investments Matter? Accounting for the Influence of Institutional Factors in the Context of Healthcare Data Breaches. *MIS Quarterly, 41*(3), 893–916. https://doi.org/10.25300/MISQ/2017/41.3.10

Asgari, N., Singh, K., & Mitchell, W. (2017). Alliance Portfolio Reconfiguration Following a Technological Discontinuity. *Strategic Management Journal, 38*(5), 1062–1081. https://doi.org/10.1002/smj.2554

Ba, S., & Pavlou, P. A. (2002). Evidence of the Effect of Trust Building Technology in Electronic Markets: Price Premiums and Buyer Behavior. *MIS Quarterly, 26*(3), 243–268. https://doi.org/10.2307/4132332

Bajarin, T. (2020). *Why Companies Need their Own AI Code of Conduct*. Retrieved from https://www.forbes.com/sites/timbajarin/2020/07/30/why-companies-need-their-own-ai-code-of-conduct/.

Bakker, R. M. (2016). Stepping In and Stepping Out: Strategic Alliance Partner Reconfiguration and the Unplanned Termination of Complex Projects. *Strategic Management Journal, 37*(9), 1919–1941. https://doi.org/10.1002/smj.2429

Baraniuk, C. (2015). *How Algorithms Run Amazon's Warehouses*. Retrieved from https://www.bbc.com/future/article/20150818-how-algorithms-run-amazons-warehouses.

Bechky, B. A., & Chung, D. E. (2018). Latitude or Latent Control? How Occupational Embeddedness and Control Shape Emergent Coordination. *Administrative Science Quarterly, 63*(3), 607–636. https://doi.org/10.1177/0001839217726545

Bellesia, F., Mattarelli, E., & Bertolotti, F. (2023). Algorithms and their Affordances: How Crowdworkers Manage Algorithmic Scores in Online Labour Markets. *Journal of Management Studies, 60*(1), 1–37. https://doi.org/10.1111/joms.12870

Benkler, Y. (2002). Coase's Penguin, or, Linux and "The Nature of the Firm". *Yale Law Journal, 112*(3), 369–446. https://doi.org/10.2307/1562247

Benlian, A., Wiener, M., Cram, W. A., Krasnova, H., Maedche, A., Möhlmann, M., … Remus, U. (2022). Algorithmic Management*: Bright and Dark Sides, Practical Implications, and Research Opportunities*. *Business & Information Systems Engineering, 64*, 825–839. https://doi.org/10.1007/s12599-022-00764-w

Bharadwaj, A., El Sawy, O. A., Pavlou, P. A., & Venkatraman, N. (2013). Digital Business Strategy: Toward a Next Generation of Insights. *MIS Quarterly, 37*(2), 471–482.

Bolukbasi, T., Chang, K.-W., Zou, J. Y., Saligrama, V., & Kalai, A. T. (2016). Man is to Computer Programmer as Woman is to Homemaker? Debiasing Word Embeddings. In D. D. Lee, U. von Luxburg, R. Garnett, M. Sugiyama, & I. Guyon (Eds.): *Vol. 29. Advances in Neural Information Processing Systems, 30th Annual Conference on Neural Information Processing Systems* (pp. 4356–4364). Barcelona, Spain: NIPS Foundation.

Brown, P., Beekes, W., & Verhoeven, P. (2011). Corporate Governance, Accounting and Finance: A Review. *Accounting & Finance, 51*(1), 96–172. https://doi.org/10.1111/j.1467-629X.2010.00385.x

Cameron, L. D., & Rahman, H. (2022). Expanding the Locus of Resistance: Understanding the Co-constitution of Control and Resistance in the Gig Economy. *Organization Science, 33*(1), 38–58. https://doi.org/10.1287/orsc.2021.1557

Cao, Z., & Lumineau, F. (2015). Revisiting the Interplay between Contractual and Relational Governance: A Qualitative and Meta-Analytic Investigation. *Journal of Operations Management, 33–34(1)*, 15–42. https://doi.org/10.1016/j.jom.2014.09.009

Chen, L., Tong, T. W., Tang, S., & Han, N. (2022). Governance and Design of Digital Platforms: A Review and Future Research Directions on a Meta-Organization. *Journal of Management, 48*(1), 147–184. https://doi.org/10.1177/01492063211045023

Chhillar, D., & Aguilera, R. V. (2022). An Eye for Artificial Intelligence: Insights Into the Governance of Artificial Intelligence and Vision for Future Research. *Business & Society, 61*(5), 1197–1241. https://doi.org/10.1177/00076503221080959

Cohen, M. D., & Bacdayan, P. (1994). Organizational Routines Are Stored as Procedural Memory: Evidence from a Laboratory Study. *Organization Science, 5*(4), 554–568. https://doi.org/10.1287/orsc.5.4.554

Commerford, B. P., Dennis, S. A., Joe, J. R., & Ulla, J. W. (2022). Man Versus Machine: Complex Estimates and Auditor Reliance on Artificial Intelligence. *Journal of Accounting Research, 60*(1), 171–201. https://doi.org/10.1111/1475-679X.12407

Constantinides, P., Henfridsson, O., & Parker, G. G. (2018). Introduction—Platforms and Infrastructures in the Digital Age. *Information Systems Research, 29*(2), 381–400. https://doi.org/10.1287/isre.2018.0794

Crolic, C., Thomaz, F., Hadi, R., & Stephen, A. T. (2022). Blame the Bot: Anthropomorphism and Anger in Customer-Chatbot Interactions. *Journal of Marketing, 86*(1), 132–148. https://doi.org/10.1177/00222429211045687

Dahlander, L., & O'Mahony, S. (2011). Progressing to the Center: Coordinating Project Work. *Organization Science, 22*(4), 961–979. https://doi.org/10.1287/orsc.1100.0571

Das, T. K., & Teng, B.-S. (2001). Trust, Control, and Risk in Strategic Alliances: An Integrated Framework. *Organization Studies, 22*(2), 251–283. https://doi.org/10.1177/0170840601222004

Dekker, H. C. (2004). Control of Inter-Organizational Relationships: Evidence on Appropriation Concerns and Coordination Requirements. *Accounting, Organizations and Society, 29*(1), 27–49. https://doi.org/10.1016/S0361-3682(02)00056-9

Dolata, M., Feuerriegel, S., & Schwabe, G. (2022). A Sociotechnical View of Algorithmic Fairness. *Information Systems Journal, 32*(4), 754–818. https://doi.org/10.1111/isj.12370

Drummer, D., & Neumann, D. (2020). Is Code Law? Current Legal and Technical Adoption Issues and Remedies for Blockchain-enabled Smart Contracts. *Journal of Information Technology, 35*(4), 337–360. https://doi.org/10.1177/0268396220924669

Edelman, G. (2022). *Paradise at the Crypto-Arcade: Inside the Web3 Revolution*. Retrieved from https://www.wired.com/story/web3-paradise-crypto-arcade/.

Eisenhardt, K. M. (1985). Control: Organizational and Economic Approaches. *Management Science, 31*(2), 134–149. https://doi.org/10.1287/mnsc.31.2.134

Fabian, N. E., Weck, M., Hanelt, A., Firk, S., Oehmichen, J., & Bhattacharya, A. (2022). Many Roads Lead to Digital Transformation: A Configurational Perspective on Digital Competence Elements. In *ICIS 2022 Proceedings* 3. https://aisel.aisnet.org/icis2022/governance_is/governance_is/3.

Fabian, N. E., Dong, J. Q., Broekhuizen, T., & Verhoef, P. C. (2023). Business Value of SME Digitalisation: When Does It Pay off More? European Journal of Information Systems. https://doi.org/10.1080/0960085X.2023.2167671.

Fama, E. F., & Jensen, M. C. (1983). Separation of Ownership and Control. *Journal of Law and Economics, 26*(2), 301–325. https://doi.org/10.1086/467037

Feldman, M. S. (2000). Organizational Routines as a Source of Continuous Change. *Organization Science, 11*(6), 611–629. https://doi.org/10.1287/orsc.11.6.611.12529

Feloni, R. (2018). Microsoft execs say in 20 years we'll all have digital assistants that will be our alter egos - and we need to set ground rules while we still can. Retrieved from https://www.businessinsider.in/microsoft-execs-say-in-20-years-well-all-have-digital-assistants-that-will-be-our-alter-egos-and-we-need-to-set-ground-rules-while-we-still-can/articleshow/62558285.cms.

Firk, S., Hanelt, A., Oehmichen, J., & Wolff, M. (2021). Chief Digital Officers: An Analysis of the Presence of a Centralized Digital Transformation Role. *Journal of Management Studies, 58*(7), 1800–1831. https://doi.org/10.1111/joms.12718

Foley, S., Karlsen, J. R., & Putniņš, T. J. (2019). Sex, Drugs, and Bitcoin: How Much Illegal Activity Is Financed through Cryptocurrencies? *Review of Financial Studies, 32*(5), 1798–1853. https://doi.org/10.1093/rfs/hhz015

Fu, R., Aseri, M., Singh, P. V., & Srinivasan, K. (2022). "Un"Fair Machine Learning Algorithms. *Management Science, 68*(6), 4173–4195. https://doi.org/10.1287/mnsc.2021.4065

Furlotti, M. (2007). There Is More to Contracts than Incompleteness: A Review and Assessment of Empirical Research on Inter-Firm Contract Design. *Journal of Management and Governance, 11*(1), 61–99. https://doi.org/10.1007/s10997-007-9020-y

Furnari, S., Crilly, D., Misangyi, V. F., Greckhamer, T., Fiss, P. C., & Aguilera, R. V. (2021). Capturing Causal Complexity: Heuristics for Configurational Theorizing. *Academy of Management Review, 46*(4), 778–799. https://doi.org/10.5465/amr.2019.0298

Gilbert, D. (2021). *Facebook Is Ignoring Moderators' Trauma: 'They Suggest Karaoke and Painting'*. Retrieved from https://www.vice.com/en/article/m7eva4/traumatized-facebook-moderators-told-to-suck-it-up-and-try-karaoke.

Gnyawali, D. R., & Ryan Charleton, T. (2018). Nuances in the Interplay of Competition and Cooperation: Towards a Theory of Coopetition. *Journal of Management, 44*(7), 2511–2534. https://doi.org/10.1177/0149206318788945

Goold, M., & Quinn, J. J. (1990). The Paradox of Strategic Controls. *Strategic Management Journal, 11*(1), 43–57. https://doi.org/10.1002/smj.4250110104

Goldsby, C. M., & Hanisch, M. (2022). The Boon and Bane of Blockchain: Getting the Governance Right. *California Management Review, 64*(3), 141–168. https://doi.org/10.1177/00081256221080747

Green, S. G., & Welsh, M. A. (1988). Cybernetics and Dependence: Reframing the Control Concept. *Academy of Management Review, 13*(2), 287–301. https://doi.org/10.5465/amr.1988.4306891

Griesbach, K., Reich, A., Elliott-Negri, L., & Milkman, R. (2019). Algorithmic Control in Platform Food Delivery Work. *Socius: Sociological Research for a Dynamic World, 5*. https://doi.org/10.1177/2378023119870041

Grossman, S. J., & Hart, O. D. (1986). The Costs and Benefits of Ownership: A Theory of Vertical and Lateral Integration. *Journal of Political Economy*, 691–719.

Gu, G., & Zhu, F. (2021). Trust and Disintermediation: Evidence from an Online Freelance Marketplace. *Management Science, 67*(2), 794–807. https://doi.org/10.1287/mnsc.2020.3583

Gulati, R. (1995). Does Familiarity Breed Trust? The Implications of Repeated Ties for Contractual Choice in Alliances. *Academy of Management Journal, 38*(1), 85–112.

Gulati, R., & Singh, H. (1998). The Architecture of Cooperation: Managing Coordination Costs and Appropriation Concerns in Strategic Alliances. *Administrative Science Quarterly, 43*(4), 781–814. https://doi.org/10.2307/2393616

Gulati, R., Wohlgezogen, F., & Zhelyazkov, P. I. (2012). The Two Facets of Collaboration: Cooperation and Coordination in Strategic Alliances. *Academy of Management Annals, 6*(1), 531–583. https://doi.org/10.1080/19416520.2012.691646

Haenlein, M., Huang, M.-H., & Kaplan, A. (2022). Guest Editorial: Business Ethics in the Era of Artificial Intelligence. *Journal of Business Ethics, 178*(4), 867–869. https://doi.org/10.1007/s10551-022-05060-x

Haenlein, M., & Kaplan, A. (2021). Artificial Intelligence and Robotics: Shaking up the Business World and Society at Large. *Journal of Business Research, 124*, 405–407. https://doi.org/10.1016/j.jbusres.2020.10.042

Hambrick, D. C., Werder, A.v., & Zajac, E. J. (2008). New Directions in Corporate Governance Research. *Organization Science, 19*(3), 381–385. https://doi.org/10.1287/orsc.1080.0361

Hanelt, A., Bohnsack, R., Marz, D., & Antunes Marante, C. (2021). A Systematic Review of the Literature on Digital Transformation: Insights and Implications for Strategy and Organizational Change. *Journal of Management Studies, 58*(5), 1159–1197. https://doi.org/10.1111/joms.12639

Hanisch, M., Theodosiadis, V., & Teixeira, F. (2022). Digital Governance: How Blockchain Technologies Revolutionize the Governance of Interorganizational Relationships. In B. S. Baalmans, T. L. J. Broekhuizen, & N. E. Fabian (Eds.), *Digital Transformation: A Guide for Managers* (1st ed., pp. 122–147). Groningen: Groningen Digital Business Center (GDBC), University of Groningen https://www.rug.nl/gdbc/blog/digital-governance-and-blockchain-technologies-02-03-2021.

Hart, O. D., & Moore, J. (1990). Property Rights and the Nature of the Firm. *Journal of Political Economy, 98*(6), 1119–1158.

Helfat, C. E., & Peteraf, M. A. (2015). Managerial Cognitive Capabilities and the Microfoundations of Dynamic Capabilities. *Strategic Management Journal, 36*(6), 831–850. https://doi.org/10.1002/smj.2247

Holthöwer, J., & van Doorn, J. (2022). Robots Do Not Judge: Service Robots Can Alleviate Embarrassment in Service Encounters. *Journal of the Academy of Marketing Science, 1–18*. https://doi.org/10.1007/s11747-022-00862-x

Hsieh, Y.-Y., & Vergne, J.-P. (2023). The Future of the Web? The Coordination and Early-stage Growth of Decentralized Platforms. *Strategic Management Journal, 44*(3), 829–857. https://doi.org/10.1002/smj.3455

Huber, T. L., Kude, T., & Dibbern, J. (2017). Governance Practices in Platform Ecosystems: Navigating Tensions between Cocreated Value and Governance Costs. *Information Systems Research, 28*(3), 563–584. https://doi.org/10.1287/isre.2017.0701

IBM. (2022). *IBM Food Trust: A New Era in the World's Food Supply*. Retrieved from https://www.ibm.com/blockchain/solutions/food-trust.

Hundt, A., Agnew, W., Zeng, V., Kacianka, S., & Gombolay, M. (2022). Robots Enact Malignant Stereotypes. In *ACM Conference on Fairness, Accountability, and Transparency* (pp. 743–756). https://arxiv.org/abs/2207.11569.

Jones, G. R. (1983). Transaction Costs, Property Rights, and Organizational Culture: An Exchange Perspective. *Administrative Science Quarterly, 28*(3), 454–467. https://doi.org/10.2307/2392252

Jones, G. R. (1984). Task Visibility, Free Riding, and Shirking: Explaining the Effect of Structure and Technology on Employee Behavior. *Academy of Management Review, 9*(4), 684–695. https://doi.org/10.5465/amr.1984.4277404

Kaal, W. A. (2021). Decentralized Autonomous Organizations: Internal Governance and External Legal Design. *Annals of Corporate Governance, 5*(4), 237–307. https://doi.org/10.1561/109.00000028

Kaplan, A., & Haenlein, M. (2020). Rulers of the World, Unite! The Challenges and Opportunities of Artificial Intelligence. *Business Horizons, 63*(1), 37–50. https://doi.org/10.1016/j.bushor.2019.09.003

Karr-Wisniewski, P., & Lu, Y. (2010). When More Is too Much: Operationalizing Technology Overload and Exploring Its Impact on Knowledge Worker Productivity. *Computers in Human Behavior, 26*(5), 1061–1072. https://doi.org/10.1016/j.chb.2010.03.008

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. https://doi.org/10.5465/annals.2018.0174

Knight, W. (2019). *The World Economic Forum wants to develop global rules for AI*. Retrieved from https://www.technologyreview.com/2019/05/28/135198/the-world-economic-forum-wants-to-develop-global-rules-for-ai/.

Kordzadeh, N., & Ghasemaghaei, M. (2022). Algorithmic Bias: Review, Synthesis, and Future Research Directions. *European Journal of Information Systems, 31*(3), 388–409. https://doi.org/10.1080/0960085X.2021.1927212

Lamy, P., Liebhaberg, B., Bourreau, M., Streel, A. de, Feasey, R., Krämer, J., … (2022). *Global Governance for the Digital Ecosystem*. Retrieved from https://cerre.eu/wp-content/uploads/2022/11/GGDE_FullReport.pdf.

Lebovitz, S., Lifshitz-Assaf, H., & Levina, N. (2022). To Engage or Not to Engage with AI for Critical Judgments: How Professionals Deal with Opacity When Using AI for Medical Diagnosis. *Organization Science, 33*(1), 126–148. https://doi.org/10.1287/orsc.2021.1549

Lee, G. K., & Cole, R. E. (2003). From a Firm-Based to a Community-Based Model of Knowledge Creation: The Case of the Linux Kernel Development. *Organization Science, 14*(6), 633–649. https://doi.org/10.1287/orsc.14.6.633.24866

Lee, M. K. (2018). Understanding Perception of Algorithmic Decisions: Fairness, Trust, and Emotion in Response to Algorithmic Management. *Big Data & Society, 5*(1), 1–16. https://doi.org/10.1177/2053951718756684

Leiblein, M. J. (2003). The Choice of Organizational Governance Form and Performance: Predictions from Transaction Cost, Resource-Based, and Real Options Theories. *Journal of Management, 29*(6), 937–961. https://doi.org/10.1016/S0149-2063_03_00085-0

Loebbecke, C., & Picot, A. (2015). Reflections on Societal and Business Model Transformation Arising from Digitization and Big Data Analytics: A Research

Agenda. *Journal of Strategic Information Systems, 24*(3), 149–157. https://doi.org/10.1016/j.jsis.2015.08.002
Lumineau, F., Schilke, O., & Wang, W. (2023). Organizational Trust in the Age of the Fourth Industrial Revolution: Shifts in the Form, Production, and Targets of Trust. *Journal of Management Inquiry, 32*(1), 21–34. https://doi.org/10.1177/10564926221127852
Lumineau, F., Wang, W., & Schilke, O. (2021). Blockchain Governance—A New Way of Organizing Collaborations? *Organization Science, 32*(2), 500–521. https://doi.org/10.1287/orsc.2020.1379
Makadok, R., & Coff, R. (2009). Both Market and Hierarchy: An Incentive-System Theory of Hybrid Governance Forms. *Academy of Management Review, 34*(2), 297–319. https://doi.org/10.5465/amr.2009.36982628
Malgonde, O., Zhang, H., Padmanabhan, B., & Limayem, M. (2020). Taming the Complexity in Search Matching: Two-Sided Recommender Systems on Digital Platforms. *MIS Quarterly, 44*(1), 48–84. https://doi.org/10.25300/MISQ/2020/14424
Marcel, J. J., Cowen, A. P., & Ballinger, G. A. (2017). Are Disruptive CEO Successions Viewed as a Governance Lapse? Evidence From Board Turnover. *Journal of Management, 43*(5), 1313–1334. https://doi.org/10.1177/0149206313503011
Martin, K. (2019). Designing Ethical Algorithms. *MIS Quarterly Executive, 18*(2), 129–142.
Massey, D. S. (2002). A Brief History of Human Society: The Origin and Role of Emotion in Social Life: 2001 Presidential Address. *American Sociological Review, 67*(1), 1–29. https://doi.org/10.2307/3088931
Mayer, R. C., Davis, J. H., & Schoorman, F. D. (1995). An Integrative Model of Organizational Trust. *Academy of Management Review, 20*(3), 709–734. https://doi.org/10.2307/258792
Mithas, S., Tafti, A., & Mitchell, W. (2013). How a Firm's Competitive Environment and Digital Strategic Posture Influence Digital Business Strategy. *MIS Quarterly, 37*(2), 511–536.
Möhlmann, M., de Lima, A., Salge, C., & Marabelli, M. (2023). Algorithm Sensemaking: How Platform Workers Make Sense of Algorithmic Management. *Journal for the Association of Information Systems, 24*(1), 35–64. https://doi.org/10.17705/1jais.00774
Möhlmann, M., Zalmanson, L., Henfridsson, O., & Gregory, R. W. (2021). Algorithmic Management of Work on Online Labor Platforms: When Matching Meets Control. *MIS Quarterly, 45*(4), 1999–2022. https://doi.org/10.25300/MISQ/2021/15333
Murray, A., Kuban, S., Josefy, M., & Anderson, J. (2021). Contracting in the Smart Era: The Implications of Blockchain and Decentralized Autonomous Organizations for Contracting and Corporate Governance. *Academy of Management Perspectives, 35*(4), 622–641. https://doi.org/10.5465/amp.2018.0066
Nambisan, S., Wright, M., & Feldman, M. (2019). The Digital Transformation of Innovation and Entrepreneurship: Progress. *Challenges and Key Themes. Research Policy, 48*(8), Article 103773. https://doi.org/10.1016/j.respol.2019.03.018
Newlands, G. (2021). Algorithmic Surveillance in the Gig Economy: The Organization of Work through Lefebvrian Conceived Space. *Organization Studies, 42*(5), 719–737. https://doi.org/10.1177/0170840620937900
Oehmichen, J., Jacobey, L., & Wolff, M. (2020). Have We Made Ourselves (too) Clear?—Performance Effects of the Incentive Explicitness in CEO Compensation. *Long Range Planning, 53*(3). https://doi.org/10.1016/j.lrp.2019.101893
Oehmichen, J., Schrapp, S., & Wolff, M. (2017). Who Needs Experts Most? Board Industry Expertise and Strategic Change—A Contingency Perspective. *Strategic Management Journal, 38*(3), 645–656. https://doi.org/10.1002/smj.2513
Oehmichen, J., Schult, A., & Dong, J. Q. (2023). Successfully Organizing AI Innovation Through Collaboration with Startups. *MIS Quarterly Executive*.
Oehmichen, J., Schult, A., & Wolff, M. (2017). Keeping their Cards Close to their Chests: How Non-Delegating CEOs Avoid Forced Career Ends. *Human Resource Management, 56*(2), 225–242. https://doi.org/10.1002/hrm.21732
Ouchi, W. G., & Maguire, M. A. (1975). Organizational Control: Two Functions. *Administrative Science Quarterly, 20*(4), 559–569. https://doi.org/10.2307/2392023
Pentland, B. T., Hærem, T., & Hillison, D. (2011). The (N)Ever-Changing World: Stability and Change in Organizational Routines. *Organization Science, 22*(6), 1369–1383. https://doi.org/10.1287/orsc.1110.0624
Pesch, R., Endres, H., & Bouncken, R. B. (2021). Digital Product Innovation Management: Balancing Stability and Fluidity through Formalization. *Journal of Product Innovation Management, 38*(6), 726–744. https://doi.org/10.1111/jpim.12609
Powell, W. W. (1990). Neither Market nor Hierarchy: Network Forms of Organization. *Research in Organizational Behavior, 12*, 295–336.
Provan, K. G., & Kenis, P. (2007). Modes of Network Governance: Structure, Management, and Effectiveness. *Journal of Public Administration Research and Theory, 18*(2), 229–252.
Puranam, P., Alexy, O., & Reitzig, M. (2014). What's "New" About New Forms of Organizing? *Academy of Management Review, 39*(2), 162–180. https://doi.org/10.5465/amr.2011.0436
Puranam, P., & Vanneste, B. S. (2009). Trust and Governance: Untangling a Tangled Web. *Academy of Management Review, 34*(1), 11–31. https://doi.org/10.5465/amr.2009.35713271
Raisch, S., & Krakowski, S. (2021). Artificial Intelligence and Management: The Automation–Augmentation Paradox. *Academy of Management Review, 46*(1), 192–210. https://doi.org/10.5465/amr.2018.0072
Renwick, R., & Gleasure, R. (2021). Those Who Control the Code Control the Rules: How Different Perspectives of Privacy Are Being Written into the Code of Blockchain Systems. *Journal of Information Technology, 36*(1), 16–38. https://doi.org/10.1177/0268396220944406
de Reuver, M., Sørensen, C., & Basole, R. C. (2018). The Digital Platform: A Research Agenda. *Journal of Information Technology, 33*(2), 124–135. https://doi.org/10.1057/s41265-016-0033-3
Ricart, J. E., Snihur, Y., Carrasco-Farré, C., & Berrone, P. (2020). Grassroots Resistance to Digital Platforms and Relational Business Model Design to Overcome It: A Conceptual Framework. *Strategy Science, 5*(3), 271–291. https://doi.org/10.1287/stsc.2020.0104
Rieger, A., Guggenmos, F., Lockl, J., Fridgen, G., & Urbach, N. (2019). Building a Blockchain Application that Complies with the EU General Data Protection Regulation. *MIS Quarterly Executive, 18*(4), 263–279. https://doi.org/10.17705/2msqe.00020
Riemer, K., & Peter, S. (2021). Algorithmic Audiencing: Why We Need to Rethink Free Speech on Social Media. *Journal of Information Technology, 36*(4), 409–426. https://doi.org/10.1177/02683962211013358
Rimba, P., Tran, A. B., Weber, I., Staples, M., Ponomarev, A., & Xu, X. (2020). Quantifying the Cost of Distrust: Comparing Blockchain and Cloud Services for Business Process Execution. *Information Systems Frontiers, 22*(2), 489–507. https://doi.org/10.1007/s10796-018-9876-1
Rutherford, M. A., Buchholtz, A. K., & Brown, J. A. (2007). Examining the Relationships Between Monitoring and Incentives in Corporate Governance. *Journal of Management Studies, 44*(3), 414–430. https://doi.org/10.1111/j.1467-6486.2007.00683.x
Sample, I. (2023). *Science Journals Ban Listing of ChatGPT as Co-author on Papers*. Retrieved from https://www.theguardian.com/science/2023/jan/26/science-journals-ban-listing-of-chatgpt-as-co-author-on-papers.
Santana, C., & Albareda, L. (2022). Blockchain and the Emergence of Decentralized Autonomous Organizations (DAOs): An Integrative Model and Research Agenda. *Technological Forecasting and Social Change, 182*, Article 121806. https://doi.org/10.1016/j.techfore.2022.121806
Seidel, M.-D.-L. (2018). Questioning Centralized Organizations in a Time of Distributed Trust. *Journal of Management Inquiry, 27*(1), 40–44. https://doi.org/10.1177/1056492617734942
Shah, S. K. (2006). Motivation, Governance, and the Viability of Hybrid Forms in Open Source Software Development. *Management Science, 52*(7), 1000–1014. https://doi.org/10.1287/mnsc.1060.0553
Shapiro, C., & Varian, H. R. (2008). *Information Rules: A Strategic Guide to the Network Economy*. Boston, MA: Harvard Business School Press.
Shaw, J.d., Gupta, N., & Delery, J. E. (2000). Empirical Organizational-level Examinations of Agency and Collaborative Predictions of Performance-contingent Compensation. *Strategic Management Journal, 21*(5), 611–623. https://doi.org/10.1002/(SICI)1097-0266(200005)21:5<611::AID-SMJ106>3.0.CO;2-U
Sparling, C. (2022). *Record-Breaking DDoS Attack in Europe*. Retrieved from https://www.akamai.com/blog/security/record-breaking-ddos-attack-in-europe#:~:text=On%20Monday%2C%20September%2012%2C%202022,cripple%20the%20organization's%20business%20operations.
Strich, F., Mayer, A.-S., & Fiedler, M. (2021). What Do I Do in a World of Artificial Intelligence? Investigating the Impact of Substitutive Decision-Making AI Systems on Employees' Professional Role Identity. *Journal of the Association for Information Systems, 22*(2), 304–324. https://doi.org/10.17705/1jais.00663
Sun Yin, H. H., Langenheldt, K., Harlev, M., Mukkamala, R. R., & Vatrapu, R. (2019). Regulating Cryptocurrencies: A Supervised Machine Learning Approach to De-Anonymizing the Bitcoin Blockchain. *Journal of Management Information Systems, 36*(1), 37–73. https://doi.org/10.1080/07421222.2018.1550550
Sundaramurthy, C., & Lewis, M. W. (2003). Control and Collaboration: Paradoxes of Governance. *Academy of Management Review, 28*(3), 397–415. https://doi.org/10.5465/amr.2003.10196737
Tajedin, H., Madhok, A., & Keyhani, M. (2019). A Theory of Digital Firm-Designed Markets: Defying Knowledge Constraints with Crowds and Marketplaces. *Strategy Science, 4*(4), 323–342. https://doi.org/10.1287/stsc.2019.0092
Tarafdar, M., Page, X., & Marabelli, M. (2023). Algorithms as Co-workers: Human Algorithm Role Interactions in Algorithmic Work. *Information Systems Journal, 33*(2), 232–267. https://doi.org/10.1111/isj.12389
Taulli, T. (2022). *How to Create a Web3 Startup: A Guide for Tomorrow's Breakout Companies*. Berkeley, CA: Apress.
Tirole, J. (1999). Incomplete Contracts: Where Do We Stand? *Econometrica, 67*(4), 741–781. https://doi.org/10.1111/1468-0262.00052
Tiwana, A. (2015). Platform Desertion by App Developers. *Journal of Management Information Systems, 32*(4), 40–77. https://doi.org/10.1080/07421222.2015.1138365
Triche, J. H., & Walden, E. (2018). The Use of Impression Management Strategies to Manage Stock Market Reactions to IT Failures. *Journal of the Association for Information Systems, 19*(4), 333–357.
Tumasjan, A. (2021). Industry Emergence between Technology and Zeitgeist: The Case of Blockchain and Crypto. In M. Kipping, T. Kurosawa, & D. E. Westney (Eds.), *Oxford Handbooks Online. The Oxford Handbook of Industry Dynamics*. New York, NY: Oxford University Press.
Uzzi, B. (1997). Social Structure and Competition in Interfirm Networks: The Paradox of Embeddedness. *Administrative Science Quarterly, 42*(1), 35–67. https://doi.org/10.2307/2393808
Vaia, G., Arkhipova, D., & DeLone, W. (2022). Digital Governance Mechanisms and Principles that Enable Agile Responses in Dynamic Competitive Environments. *European Journal of Information Systems, 31*(6), 662–680. https://doi.org/10.1080/0960085X.2022.2078743
Vergne, J.-P. (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

Verhoef, P. C., Broekhuizen, T. L. J., Bart, Y., Bhattacharya, A., Dong, J. Q., Fabian, N. E., & Haenlein, M. (2021). Digital Transformation: A Multidisciplinary Reflection and Research Agenda. *Journal of Business Research, 122*, 889–901. https://doi.org/10.1016/j.jbusres.2019.09.022

Vial, G. (2019). Understanding Digital Transformation: A Review and a Research Agenda. *Journal of Strategic Information Systems, 28*(2), 118–144. https://doi.org/10.1016/j.jsis.2019.01.003

Vincent, J. (2022). *AI-generated answers temporarily banned on coding Q&A site Stack Overflow*. Retrieved from https://www.theverge.com/2022/12/5/23493932/chatgpt-ai-generated-answers-temporarily-banned-stack-overflow-llms-dangers.

Walsh, J. P., & Dewar, R. D. (1987). Formalization and the Organizational Life Cycle. *Journal of Management Studies, 24*(3), 215–231. https://doi.org/10.1111/j.1467-6486.1987.tb00700.x

Wang, P. (2010). Chasing the Hottest IT: Effects of Information Technology Fashion on Organizations. *MIS Quarterly, 34*(1), 63–85. https://doi.org/10.2307/20721415

Werbach, K. D. (2018). *The Blockchain and the New Architecture of Trust. Information Policy Series.* Cambridge, MA: MIT Press.

Westphal, J. D. (1999). Collaboration in the Boardroom: Behavioral and Performance Consequences of CEO-Board Social Ties. *Academy of Management Journal, 42*(1), 7–24. https://doi.org/10.5465/256871

Williamson, O. E. (1991). Comparative Economic Organization: The Analysis of Discrete Structural Alternatives. *Administrative Science Quarterly, 36*(2), 269–296. https://doi.org/10.2307/2393356

Zapadka, P., Hanelt, A., Firk, S., & Oehmichen, J. (2020). Leveraging "AI-as-a-Service" – Antecedents and Consequences of Using Artificial Intelligence Boundary Resources. In *In Proceedings of the 41st International Conference on Information Systems* (pp. 1–17).

Zhang, N., Wang, C., Karahanna, E., & Xu, Y. (2022). Peer Privacy Concerns: Conceptualization and Measurement. *MIS Quarterly, 46*(1), 491–530. https://doi.org/10.25300/MISQ/2022/14861

Zhao, X., Ai, P., Lai, F., Luo, X., & Benitez, J. (2022). Task Management in Decentralized Autonomous Organization. *Journal of Operations Management, 68*(6–7), 649–674. https://doi.org/10.1002/joom.1179

Zheng, Z., Xie, S., Dai, H.-N., Chen, X., & Wang, H. (2017). *An Overview of Blockchain Technology: Architecture, Consensus, and Future Trends* (pp. 557–564). New York, NY: IEEE.

Zhu, Kraemer, Gurbaxani, & Xu. (2006). Migration to Open-Standard Interorganizational Systems: Network Effects, Switching Costs, and Path Dependency. *MIS Quarterly*, *30* (Special Issue), 515–539. doi: 10.2307/25148771.

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