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# Unpacking Digital Network Coordination: Beyond Hierarchy and Market in the Age of Algorithmic Organizing

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## Abstract

Digital networks have fundamentally altered how coordination occurs across organizational boundaries. Yet, existing theories remain anchored in hierarchical and market-based logics that assume authority or price as primary coordinating mechanisms. This conceptual paper develops a theoretical explanation of coordination in digital networks, moving beyond traditional organizing forms to articulate a distinct logic based on architecture, algorithms, and data flows. We identify the limits of hierarchy and market in digitally mediated environments, particularly where interdependence is high, actors are distributed, and real-time adaptation is required. Building on recent advances in platform ecosystems, digital infrastructures, and algorithmic coordination, we theorize digital network coordination as a distinct organizational logic characterized by platform-mediated interactions, modular interfaces, algorithmic governance, and real-time feedback. We propose a conceptual framework that specifies four core coordination mechanisms—platform-based orchestration, interface modularity, algorithmic adjustment, and data-driven synchronization—and explains how they substitute for and complement traditional mechanisms. Our analysis challenges assumptions about firm boundaries and authority-based control, suggesting that coordination increasingly shifts from centralized decision-making to distributed, architecture-enabled adaptation. We offer implications for organizational theory and outline boundary conditions under which digital network coordination is most effective.

**Keywords** Algorithmic governance, Coordination mechanisms, Platform ecosystems, Digital networks, Modularity, Organizational theory

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## Introduction

Coordination—the management of interdependencies among tasks and actors—has long been understood through the conceptual lens of markets and hierarchies. Markets coordinate through price signals and voluntary exchange, while hierarchies rely on authority, rules, and centralized decision-making. For decades, this duality dominated organizational theory, with hybrid forms recognized but ultimately understood as combinations of these two pure types [1–8]. However, the rapid proliferation of digitally mediated work processes, platform ecosystems,

and decentralized technologies has rendered this traditional framework increasingly inadequate [1, 4, 9–13].

Digital networks enable forms of coordination that neither resemble market-based price mechanisms nor hierarchical command-and-control structures. Consider how a digital platform orchestrates thousands of independent developers contributing modular components without direct employment relationships or spot contracts [2, 14]. Consider how algorithmic management systems coordinate crowdworkers across global locations, adjusting task allocation in real time based on performance data and demand signals [7, 15]. Consider how blockchain-based

protocols coordinate anonymous actors through smart contracts that enforce reciprocal exchange without central authority or legal enforcement [16, 17]. These phenomena challenge organizational scholars to reconceptualize coordination itself.

The central problem we address is this: existing theories do not adequately explain how coordination is achieved in digital networks where actors are distributed, interdependence is complex, authority is decentralized or absent, and adaptation must occur in real time. Prior research has examined platform governance [3, 18], ecosystem architecture [5, 19], and algorithmic control [15, 20], but these streams remain fragmented. What is missing is a coherent theoretical account of digital network coordination as a distinct organizational logic—one that operates through architecture, algorithms, and data rather than primarily through authority or price.

Our objective in this conceptual paper is to develop such a theoretical explanation. Drawing on recent theory-building work in platform ecosystems [1–3], digital infrastructures [4, 21], coordination mechanisms [6, 8], and network governance [22, 23], we theorize how digital networks achieve coordination without relying on traditional hierarchical or market-based mechanisms. We argue that digital network coordination represents a distinct mode of organizing characterized by: (1) platform-mediated interactions that reduce transaction costs and enable scalable interdependence; (2) modular interfaces that specify interaction protocols without dictating actions; (3) algorithmic governance that automates rule enforcement and adaptation; and (4) data-driven synchronization that provides real-time feedback across distributed actors.

Our contribution is threefold. First, we provide a systematic critique of the limits of hierarchy and market coordination in digitally mediated environments, specifying conditions under which traditional mechanisms fail. Second, we articulate the core mechanisms of digital network coordination and explain how they function individually and in combination. Third, we develop a conceptual framework that maps the relationships among these mechanisms and identifies boundary conditions for their effectiveness. This framework advances organizational theory by moving beyond the hierarchy-market dichotomy and offering analytical tools for understanding coordination in an era of platforms, algorithms, and decentralized networks.

# Beyond Hierarchy and Market: Limits of Traditional Coordination

## Coordination as interdependence management

Coordination is fundamentally about managing interdependencies among tasks, actors, and resources [6, 8]. Thompson's classic typology distinguished among pooled, sequential, and reciprocal interdependence, each requiring a different coordination approach. Hierarchies address interdependence through centralized authority, standardized procedures, and direct supervision [9, 11]. Markets address interdependence through price mechanisms, contracts, and competitive bidding [10, 12]. In both cases, coordination mechanisms serve to reduce uncertainty, align expectations, and enable interdependent action.

However, these traditional mechanisms rest on assumptions that digital networks increasingly violate. Hierarchies assume that authority can be clearly allocated, that information can be aggregated upward, and that decisions can be communicated downward [9, 24]. Markets assume that prices capture relevant information, that contracts can specify contingencies, and that actors behave opportunistically but calculatively [10, 25]. Digital environments characterized by distributed actors, rapid change, algorithmic mediation, and complex interdependence strain these assumptions beyond their breaking point.

## Limits of hierarchical coordination

Hierarchical coordination faces three fundamental limitations in digital networks. First, hierarchy requires clear boundaries between the organization and its environment [11, 18]. Yet digital platforms and ecosystems blur these boundaries by incorporating external developers, complementors, and users as semi-integrated actors who are neither employees nor arm's-length contractors [2, 14]. When value creation depends on thousands of autonomous actors outside formal authority relationships, hierarchical direction becomes impossible or counterproductive.

Second, hierarchical coordination assumes that centralized decision-makers possess sufficient information to direct interdependent activities [9, 24]. Digital networks, however, generate vast amounts of distributed, real-time data that

cannot be effectively aggregated to a single point. The speed and volume of interactions on digital platforms—millions of transactions, updates, and user actions daily—overwhelm hierarchical information processing capacities [1, 4]. Moreover, local information held by distributed actors often cannot be codified or transmitted to central decision-makers without loss [6, 20].

Third, hierarchical coordination relies on authority-based control mechanisms, including directives, monitoring, and sanctions [11, 15]. In digital networks, such mechanisms become difficult to enforce when actors are geographically dispersed, legally independent, and can exit at low cost. Platform complementors may ignore platform owner directives if they perceive them as illegitimate or value-destroying [3, 18]. Algorithmic management systems can substitute for some monitoring functions but introduce new challenges around transparency, fairness, and resistance [7, 15].

## Limits of market coordination

Market coordination, while more flexible than hierarchy, also exhibits critical limitations in digital networks. First, markets require well-defined property rights and enforceable contracts [10, 25]. Digital assets—software code, data, user-generated content, algorithms—often lack clear ownership or are non-rivalrous [2, 17]. Smart contracts and blockchain protocols address some contracting challenges but introduce new complexities around code interpretation and upgrade governance [16, 26].

Second, market coordination assumes that price mechanisms can efficiently allocate resources across interdependent actors [12, 27]. However, many digital network interactions involve strong complementarities and network effects that prices alone cannot resolve. A developer deciding whether to build on a platform considers not only direct costs and benefits but also the platform's installed base, complementary offerings, and future governance [3, 14]. These strategic interdependencies require coordination beyond what price signals can convey.

Third, markets rely on competition to discipline opportunistic behavior [10, 25]. In digital networks, switching costs, network effects, and data asymmetries can create lock-in and concentration, undermining competitive dynamics. Platform owners may exploit their gatekeeper position to extract value from complementors, while

complementors may free-ride on platform investments [2, 18]. Market mechanisms alone provide insufficient safeguards against such appropriation risks.

## The coordination gap in digital environments

The limitations of both hierarchy and markets create what we term a coordination gap in digital networks: situations in which interdependent actors must coordinate their actions but cannot rely on either authority or price. This gap emerges under specific conditions that characterize many digitally mediated organizing contexts:

First, distributed authority occurs when no single actor possesses legitimate authority over all interdependent parties. Open source software communities, blockchain networks, and multi-sided platforms all exhibit distributed authority structures where coordination must occur without hierarchical fiat [2, 16, 23].

Second, dynamic interdependence arises when the nature and intensity of interdependencies change rapidly, making it impossible to specify coordination protocols *ex ante* through contracts or standard operating procedures [1, 5]. Real-time adaptation becomes necessary, but neither markets nor hierarchies adapt quickly without significant transaction costs.

Third, high asset specificity, combined with non-rivalrous assets, characterizes many digital contexts. Code, data, and algorithms are highly specific to particular platforms or ecosystems but can be replicated at near-zero marginal cost [17, 19]. This combination creates governance challenges that traditional mechanisms struggle to address.

Fourth, information asymmetry and uncertainty pervade digital networks where actors possess heterogeneous, often unverifiable information about capabilities, intentions, and contributions [7, 20]. Hierarchies cannot observe distributed action effectively, while markets cannot reliably price unobservable quality.

These conditions generate demand for novel coordination mechanisms that operate differently from hierarchy and market. Digital networks respond not by abandoning traditional mechanisms entirely, but by complementing them with architecture-based, algorithmically enabled approaches that leverage digital infrastructure capabilities [4, 5, 21].

# From Authority and Price to Architecture and Algorithms

The transition we observe is from coordination based on authority (hierarchy) and price (market) toward coordination based on architecture and algorithms [1, 4, 13]. Architecture refers to the modular structure of digital systems—the decomposition of tasks into loosely coupled components connected through standardized interfaces [5, 19]. Algorithms refer to rule-based procedures that automate decision-making, resource allocation, and enforcement [7, 15, 20].

Architecture enables coordination by reducing the need for direct communication among interdependent actors. When tasks are modularized and interfaces are well-specified, actors can coordinate through the architecture itself: each component interacts with others through standard protocols, and changes to one component need not propagate throughout the system [5, 14]. This modularity substitutes for hierarchical integration by embedding coordination into technical structures.

Algorithms enable coordination by automating rule enforcement and real-time adaptation. Algorithmic management systems allocate tasks, monitor performance, and adjust incentives without human intervention [7, 15]. Smart contracts execute transactions automatically when conditions are met [16, 17]. Recommendation algorithms coordinate supply and demand by matching users with relevant content or partners [1, 20]. These algorithmic mechanisms substitute for both market prices and hierarchical directives by embedding coordination logic directly into digital infrastructure.

Together, architecture and algorithms constitute the foundation of what we term digital network coordination: the management of interdependent action among distributed actors through platform-mediated interactions, modular interfaces, algorithmic governance, and data-driven feedback. In the next section, we theorize this organizational logic in greater depth.

## Digital Networks as a New Organizational Logic

### Defining digital network coordination

We define digital network coordination as the management of task and resource interdependencies among distributed actors through mechanisms embedded in digital infrastructure, including platforms, modular interfaces, algorithms, and real-time data flows, where coordination occurs without exclusive reliance on hierarchical authority or market prices.

This definition emphasizes four distinctive features. First, coordination mechanisms are embedded in digital infrastructure rather than residing solely in organizational structures or contractual arrangements [4, 21]. Platforms serve as coordinating hubs, interfaces specify interaction protocols, and algorithms automate governance functions. Second, actors are distributed across organizational boundaries, often lacking formal authority relationships [2, 23]. Third, coordination occurs without exclusive reliance on hierarchy or market, though these may play supporting roles. Fourth, real-time data flows enable continuous adaptation and feedback [1, 7].

Digital network coordination differs from prior conceptualizations of network governance [22, 24] in its emphasis on technical rather than purely social mechanisms. Traditional network governance research emphasized trust, relational embeddedness, and informal norms as coordination mechanisms [22]. While these remain relevant, digital networks introduce technical mechanisms—platform architectures, APIs, algorithms, smart contracts—that operate differently from relational governance. These technical mechanisms can substitute for trust (through cryptographic verification), complement relational ties (through data-enhanced transparency), or operate autonomously (through algorithmic decision-making).

## Core coordination mechanisms

We identify four core mechanisms of digital network coordination, each addressing specific coordination challenges and operating through distinct processes.

Platform-based orchestration refers to coordination achieved through a digital platform that serves as an intermediary, governance hub, and resource provider [1-3]. Platforms orchestrate distributed actors by: (1) providing shared infrastructure and development resources; (2) establishing participation rules and governance protocols; (3) curating and matching supply and demand; and (4) managing interdependencies among complementors [3, 14,

18]. Platform orchestration differs from hierarchical direction because platform owners cannot command complementors; instead, they shape behavior through boundary resources, incentive design, and selective access [2, 18]. It differs from market coordination because platforms actively manage complementarities and network effects rather than passively matching buyers and sellers [1, 13].

Interface modularity refers to coordination achieved through technical interfaces that specify interaction protocols while hiding internal complexity [5, 14, 19]. Modular interfaces—APIs, SDKs, data schemas, communication protocols—enable loosely coupled interdependence by standardizing how components interact without dictating how each component operates internally [5, 19]. This reduces coordination costs by eliminating the need for direct communication about implementation details. Actors coordinate through the interface: as long as each component complies with interface specifications, the overall system functions without centralized integration. Interface modularity substitutes for hierarchical integration by embedding coordination into technical standards.

Algorithmic governance refers to coordination achieved through rule-based algorithms that automate decision-making, resource allocation, rule enforcement, and performance monitoring [7, 15, 20]. Algorithmic governance mechanisms include: (1) automated task allocation and matching algorithms; (2) smart contracts that execute conditional transactions; (3) algorithmic performance evaluation and feedback systems; (4) automated reputation and ranking systems; and (5) algorithmic content moderation and rule enforcement [7, 16, 17]. These mechanisms coordinate without human intervention by embedding governance rules directly into code. Algorithmic governance differs from both hierarchical direction (no human manager makes case-by-case decisions) and market contracts (automated execution eliminates renegotiation and opportunism).

Data-driven synchronization refers to coordination achieved through real-time data flows that provide visibility into distributed actions, enable rapid feedback, and support adaptive adjustment [1, 4, 20]. Data-driven synchronization operates through: (1) shared dashboards and analytics that create common situational awareness; (2) real-time alerts and notifications that trigger coordinated responses; (3) streaming data that enables continuous replanning; and (4) predictive analytics that anticipate coordination needs

before they become critical [1, 7, 21]. Unlike hierarchical coordination, which relies on periodic upward reporting, data-driven synchronization makes distributed action visible to all relevant parties simultaneously, enabling self-synchronization without central direction.

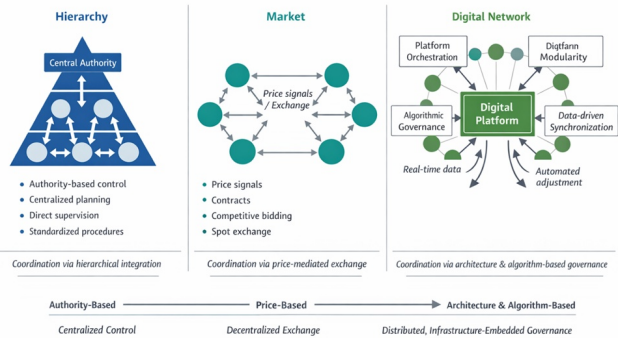
These four mechanisms operate interdependently. Platform orchestration provides the institutional framework within which modular interfaces, algorithmic governance, and data flows operate [3, 18]. Interface modularity enables scalable platform growth by reducing coordination overhead [5, 19]. Algorithmic governance automates many platform coordination functions [7, 15]. Data-driven synchronization provides real-time intelligence that enables algorithmic adjustment [1, 20]. Together, they constitute a coherent coordination logic distinct from hierarchy and market. Table 1 summarizes the contrasts across three coordination logics.

**Table 1.** Comparison of coordination logics: hierarchy, market, and digital network

| Dimension                      | Hierarchy                          | Market                              |
|--------------------------------|------------------------------------|-------------------------------------|
| Primary coordination mechanism | Authority                          | Price                               |
| Core instruments               | Directives, rules, and supervision | Contracts, pricing, and competition |
| Control locus                  | Centralized                        | Decentralized (actors)              |
| Information processing         | Central aggregation                | Price signals                       |
| Adaptation mode                | Planned and episodic               | Ex post adjustment (recontracting)  |
| Governance logic               | Command-and-control                | Exchange and competition            |
| Enforcement mechanism          | Managerial authority               | Legal contracts                     |
| Actor relationships            | Employment/authority-based         | Arm's-length exchange               |
|                                |                                    |                                     |

|                                 |                                       |                                      |
|---------------------------------|---------------------------------------|--------------------------------------|
| <b>Boundary definition</b>      | Clear firm boundaries                 | Market boundaries                    |
| <b>Interdependence handling</b> | Hierarchical integration              | Contractual specification            |
| <b>Speed of coordination</b>    | Slow to moderate                      | Moderate                             |
| <b>Scalability</b>              | Limited by managerial capacity        | Moderate                             |
| <b>Role of technology</b>       | Supporting tool                       | Transaction facilitator              |
| <b>Primary risks</b>            | Bureaucratic rigidity                 | Opportunism and incomplete contracts |
| <b>Best-fit conditions</b>      | Tacit knowledge and non-modular tasks | Standardized, priceable transactions |

The mechanisms differ along several dimensions. Control locus shifts from central (hierarchy) to distributed (market) to embedded in infrastructure (digital networks). Information processing shifts from centralized aggregation (hierarchy) to price signals (market) to real-time distributed data flows (digital networks). Adaptation mode shifts from planned change (hierarchy) to ex post recontracting (market) to continuous algorithmic adjustment (digital networks). Enforcement shifts from managerial authority (hierarchy) to legal contracts (market) to automated code execution (digital networks). **Figure 1** presents a comparative framework with three columns representing hierarchy, market, and digital network coordination logics.



**Figure 1.** Organizational logic of digital network coordination

# Theorizing Digital Network Coordination: A Conceptual Framework

## The logic of architecture-embedded coordination

Having established the limitations of traditional coordination mechanisms and identified four core mechanisms of digital network coordination, we now develop a theoretical framework that explains how these mechanisms function individually and in combination. Our central theoretical proposition is that digital network coordination operates according to a distinct logic—architecture-embedded coordination—in which coordination capabilities are encoded into digital infrastructure rather than residing solely in organizational structures or market arrangements.

Architecture-embedded coordination rests on three theoretical foundations. First, following research on modular systems [5, 19], we posit that well-designed interfaces reduce coordination costs by encapsulating complexity and standardizing interactions. When interfaces specify all necessary interaction protocols, actors need not communicate about implementation details; coordination occurs through compliance with interface specifications rather than through direct negotiation or hierarchical direction. This represents a fundamental shift from *process-based* coordination (managing how actors interact) to *structure-based* coordination (designing the technical environment within which interactions occur) [1, 4].

Second, building on work in algorithmic governance [7, 15, 20], we argue that algorithms enable coordination at scales and speeds beyond those of human decision-makers. Algorithms process vast amounts of real-time data, detect patterns and anomalies, allocate resources according to programmable rules, and execute transactions automatically. This shifts coordination from discretionary (managers deciding case by case) to programmatic (rules embedded in code executing automatically). However, algorithmic governance introduces new challenges around transparency, accountability, and adaptability when circumstances change [7, 15].

Third, integrating insights from platform ecosystem research [2, 3, 14], we theorize that platforms serve as coordination hubs that aggregate distributed actors, provide shared infrastructure, and govern participation rules. Platforms achieve coordination not by commanding actors but by shaping the incentive structures, access to capabilities, and interaction possibilities available to participants [18, 21]. This represents a shift from directive coordination (telling actors what to do) to enabling coordination (providing the infrastructure and rules within which actors coordinate themselves).

## The coordination mechanisms interaction model

The four mechanisms we identified—platform orchestration, interface modularity, algorithmic governance, and data-driven synchronization—do not operate in isolation. We propose an interaction model specifying how these mechanisms relate to one another and under what conditions each dominates.

### Substitution relationships

Under certain conditions, one mechanism can substitute for another. When interface modularity is high and interfaces are fully specified, the need for platform orchestration decreases because actors can coordinate directly through interfaces without platform-mediated matching or governance [5, 14]. Similarly, when algorithmic governance is sufficiently sophisticated, the need for human-driven platform orchestration diminishes; algorithms can allocate tasks, enforce rules, and resolve disputes without platform owner intervention [7, 15]. Data-driven synchronization can substitute for both algorithmic governance and platform orchestration when actors have sufficient visibility into each other's actions to coordinate without centralized algorithms or platform mediation [1, 20].

### Complementarity relationships

Under other conditions, mechanisms exhibit complementarity—the presence of one enhances the effectiveness of another. Platform orchestration creates the institutional context within which modular interfaces gain value; without a platform providing governance and infrastructure, modular interfaces lack the coordinating authority to resolve disputes or enforce standards [3, 18]. Algorithmic governance depends on data-driven synchronization for inputs; algorithms cannot govern effectively without real-time data about actor behavior and

system state [7, 20]. Interface modularity and algorithmic governance complement each other when algorithms monitor interface compliance and automatically flag violations [15, 19].

### Sequencing and evolution

The relative importance of mechanisms may shift over time as digital networks evolve. Early in platform emergence, platform orchestration may dominate as the platform owner establishes basic rules and infrastructure [2, 13]. As the network grows, interface modularity becomes critical for managing coordination overhead; without modularity, the platform cannot scale [5, 14]. Algorithmic governance becomes increasingly important as transaction volume exceeds human processing capacity [7, 15]. Data-driven synchronization provides continuous feedback, enabling each mechanism to adapt to changing conditions [1, 20].

## Boundary conditions and contingencies

Digital network coordination is not universally superior to hierarchy or market. We identify four boundary conditions that moderate its effectiveness.

### Task modularity

Digital network coordination requires that tasks can be decomposed into relatively independent modules connected through standardized interfaces [5, 19]. When tasks exhibit high reciprocal interdependence requiring intensive, non-standardized communication, hierarchical coordination may be more effective. Conversely, when tasks are highly modular, digital network coordination excels.

### Asset codifiability

Digital network coordination assumes that coordination-relevant information can be codified into data, algorithms, and interface specifications [4, 20]. When coordination relies on tacit knowledge, intuition, or contextual judgment that cannot be codified, human-centric hierarchical or relational coordination may be necessary. Algorithmic governance particularly suffers when performance cannot be measured and codified reliably [7, 15].

### Institutional environment

Digital network coordination operates within broader legal and social institutions. In environments with weak contract enforcement or property rights protection, platform-based orchestration and algorithmic governance may substitute

for missing institutions [16, 17]. However, when institutional voids are extreme, even digital mechanisms may fail. Conversely, in environments with strong institutions, market coordination may be more efficient for many transactions [10, 12].

### Scale and network effects

Digital network coordination exhibits increasing returns to scale because platform infrastructure, modular interfaces, and algorithms have high fixed costs but low marginal costs [2, 13]. At small scales, hierarchical or market coordination may be more efficient. At large scales with strong network effects, digital network coordination becomes increasingly advantageous. However, very large networks may experience coordination failures due to algorithm brittleness or interface rigidity [1, 15].

## A contingent theory of coordination mode choice

Integrating the above analysis, we propose a contingent theory specifying when each coordination logic—hierarchy, market, or digital network—is likely to dominate. The choice among coordination modes depends on three contingency factors: interdependence structure, information characteristics, and governance requirements.

When interdependence is reciprocal and non-modular, information is tacit and non-codifiable, and governance requires discretionary judgment, hierarchy is most effective. When interdependence is pooled or sequential, information is codifiable into prices, and governance requires competitive discipline, the market is most effective. When interdependence is complex but modular, information is codifiable into data and algorithms, and governance requires automated, real-time adjustment, digital network coordination is most effective.

Importantly, these modes can and do coexist. Hybrid arrangements are common: platforms use market mechanisms (pricing) for some transactions, hierarchical mechanisms (ownership of core components) for others, and digital network coordination (algorithms, interfaces) for yet others [1, 3, 14]. The theoretical challenge is not to declare one mode superior but to specify the conditions under which each mechanism contributes to effective coordination.

## Toward a Revised Organizational Theory

### Implications for firm boundaries, authority, and adaptation

Our analysis challenges traditional transaction cost economics [10, 25]. In digital network coordination, the choice between make (hierarchy) and buy (market) becomes insufficient because platforms enable a third option: enable through architecture. Rather than integrating complementors hierarchically or contracting at arm's length, platform owners coordinate through modular interfaces and algorithmic governance while maintaining organizational separation [2, 14, 18]. Firm boundaries become more porous and less determinate. Value creation occurs across ecosystems of legally independent actors coordinated through digital infrastructure rather than through ownership or contracts alone [3, 13, 19]. However, boundaries do not disappear entirely. Platform owners must decide which components to develop internally, source through markets, or enable through architectural coordination [5, 14]. Digital assets exhibit lower asset specificity in some respects (replicability) but higher in others (platform-specificity) [17, 19]. Algorithmic governance reduces some contracting costs but introduces new costs around algorithm design and maintenance [7, 15].

Traditional theory treats authority as the defining feature of organizations [9, 11]. Our analysis suggests effective coordination in digital networks often occurs with minimal or decentralized authority. Platform owners possess authority over interface specifications and governance rules but lack authority over how complementors design offerings or how users behave [2, 18]. Algorithmic governance substitutes code-based rules for managerial authority [7, 15, 20]. We propose distributed authority: authority fragmented across multiple actors and embedded in technical infrastructure. Platform owners hold architectural authority. Algorithms hold operational authority. Complementors hold implementation authority. Users hold evaluative authority. Traditional control mechanisms become supplemented or replaced by architectural control (interfaces that constrain behavior) and algorithmic control (automated rule enforcement) [7, 15]. These novel forms raise concerns about transparency, accountability, and due process.

Hierarchical organizations adapt slowly due to bureaucratic inertia [9, 11]. Markets adapt more quickly through price signals [10, 12]. Digital networks may enable adaptation at

faster speeds through continuous algorithmic adjustment. When coordination mechanisms are embedded in digital infrastructure, adaptation occurs through software updates rather than organizational restructuring. Interface specifications can be revised and deployed globally within hours. Algorithmic rules can be modified through code changes without renegotiating contracts [1, 4, 20]. However, rapid adaptation introduces vulnerabilities. Algorithmic adaptation can produce unintended consequences when optimizing for measured metrics at the expense of unmeasured outcomes [7, 15]. Rapid interface changes can disrupt complementors with specific investments [14, 18]. The same infrastructure enabling coordination can create lock-in and brittleness when systems become too tightly coupled [5, 19].

## Conclusion

This paper has developed a theoretical explanation of how coordination is achieved in digital networks, moving beyond traditional hierarchy-market dichotomies. We made four primary contributions.

First, we identified the limits of hierarchical and market coordination in digitally mediated environments, specifying conditions—distributed authority, dynamic interdependence, non-rivalrous asset specificity, and information asymmetry—under which traditional mechanisms fail. This analysis clarifies why digital networks generate demand for novel coordination approaches.

Second, we articulated digital network coordination as a distinct organizational logic characterized by four core mechanisms: platform-based orchestration, interface modularity, algorithmic governance, and data-driven synchronization. We explained how each mechanism

functions and how they substitute for and complement each other under different conditions.

Third, we developed a conceptual framework specifying boundary conditions and contingencies that moderate the effectiveness of digital network coordination. Task modularity, asset codifiability, institutional environment, and scale determine when digital network coordination dominates and when hierarchy or the market remains superior.

Fourth, we drew implications for organizational theory, challenging assumptions about firm boundaries, authority, and adaptation. We argued that digital networks enable porous boundaries, distributed authority, and continuous algorithmic adaptation—phenomena that existing theories struggle to explain.

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