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EDITORIAL

Algorithmic Market Transformation

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Artificial intelligence and algorithmic infrastructures are rapidly reshaping the architecture of digital markets. Earlier phases of digital transformation emphasized connectivity, platform scale, and network effects as the primary sources of competitive advantage. While these forces remain influential, contemporary digital ecosystems increasingly operate through algorithmically mediated coordination systems that govern visibility, pricing, and interaction among market participants. Algorithms no longer function merely as analytical tools supporting managerial decisions; they have become embedded governance mechanisms that structure how transactions occur and how competition unfolds in digitally mediated environments (Raisch & Krakowski, 2021).

This issue examines how algorithmic infrastructures reshape the foundations of market organization across multiple analytical levels. The contributions in this volume explore how artificial intelligence affects market structuring, value appropriation, organizational boundaries, demand formation, pricing legitimacy, and productivity dynamics within platform ecosystems. Taken together, the articles reveal that digital competition is increasingly organized through algorithmic architectures that redistribute control over information flows, coordination mechanisms, and economic outcomes. Understanding digital markets today therefore requires moving beyond firm-centric perspectives and examining how algorithmic infrastructures transform the broader ecosystem in which firms operate (Jacobides et al., 2018).

Algorithmic Coordination of Digital Markets

Digital markets are increasingly shaped by algorithmic infrastructures that organize interactions among firms, consumers, and platforms. Earlier discussions of digital competition emphasized network effects, platform scale, and technological innovation as the primary drivers of competitive advantage. Recent developments, however, indicate a deeper transformation in which algorithms operate as coordination mechanisms that structure visibility, ranking, and transactional flows within digital ecosystems. In such environments, competition is no longer determined solely by strategic positioning among firms but increasingly by the algorithmic architectures that govern exposure and interaction within digital platforms.

Algorithmic mediation has therefore become a defining feature of contemporary digital economies. Recommendation systems, predictive analytics, and machine learning models shape how information circulates and how consumers encounter alternatives. These algorithmic infrastructures effectively reorganize market structures by determining which products become visible, which sellers gain attention, and how transactions materialize within platform-mediated environments. As a result, market coordination is progressively

embedded within computational systems rather than emerging purely from decentralized competitive interactions (Parker et al., 2016; Raisch & Krakowski, 2021).

Data Aggregation and Value Capture

The expansion of algorithmic infrastructures has also transformed how value is created and appropriated within digital ecosystems. Firms participating in digital platforms continuously generate transactional and behavioral data that feed machine learning models. Yet the aggregation and processing of these data streams often occur within centralized infrastructures controlled by platform operators rather than by individual firms. This configuration introduces structural asymmetries in how value is captured within platform-mediated markets.

Research on digital ecosystems suggests that control over data aggregation architectures can produce compounding advantages through data-enabled learning. As machine learning systems improve with increasing data volume and diversity, actors controlling aggregation infrastructures may accumulate strategic advantages that individual firms cannot replicate independently. This dynamic shifts the locus of competitive advantage from localized resource ownership toward architectural control over data infrastructures (Hagiu & Wright, 2020; Jacobides et al., 2018).

Consequently, participation in digital platforms simultaneously expands market access while potentially intensifying structural dependence on centralized infrastructures. Firms may contribute valuable data to the ecosystem while capturing only a limited portion of the resulting value. Understanding this evolving relationship between participation and appropriation is therefore essential for explaining competitive dynamics in algorithmically governed markets.

Algorithmic Mediation and Organizational Boundaries

Algorithmic infrastructures also challenge classical assumptions regarding organizational boundaries. Traditional theories of the firm assume that ownership aligns with coordination authority and capability execution. In digital ecosystems, however, firms increasingly embed externally governed algorithmic systems into operational routines such as pricing, demand forecasting, performance monitoring, and marketing automation. These systems often function as centralized coordination infrastructures controlled by platform orchestrators rather than by participating firms.

When algorithmic outputs become integrated into everyday workflows, coordination authority may extend beyond formal ownership boundaries. Decision rules embedded in algorithms influence pricing strategies, visibility mechanisms, and resource allocation without requiring asset transfer or hierarchical integration. As a result, organizational boundaries become increasingly permeable, reflecting dependence on externally governed infrastructures that mediate strategic and operational processes (Adner, 2017; Kellogg et al., 2020).

This transformation suggests that the effective boundary of the firm is no longer defined solely by legal ownership but also by infrastructural control over algorithmically mediated coordination processes. Firms remain legally autonomous while simultaneously becoming functionally embedded within broader computational ecosystems.

Fragmented Demand and Pricing Legitimacy

Algorithmic personalization further reshapes the structure of demand in digital markets. Personalized recommendation systems and targeted content delivery mechanisms fragment shared consumer exposure by curating individualized information environments. Consumers increasingly encounter distinct subsets of alternatives, reducing the common reference points that traditionally structure competitive positioning.

Such fragmentation produces new strategic challenges for firms attempting to maintain coherent positioning across heterogeneous consumer interactions. At the same time, algorithmic pricing systems introduce additional normative tensions. Dynamic and personalized pricing mechanisms can enhance efficiency and responsiveness but may also challenge consumer expectations regarding fairness and transparency. Perceptions of fairness depend not only on price outcomes but also on the legitimacy of the processes generating those outcomes (Bolton et al., 2003; Xia et al., 2004).

These developments indicate that algorithmic optimization operates within normative boundaries shaped by consumer expectations and institutional legitimacy. Firms therefore face the dual challenge of pursuing computational efficiency while maintaining trust and legitimacy within increasingly data-driven market environments.

Productivity in Platform Ecosystems

The structural transformation of digital markets ultimately extends to the productivity dynamics of platform ecosystems. Artificial intelligence can significantly improve task-level efficiency by accelerating decision processes and automating routine activities. However, these improvements do not always translate directly into firm-level productivity gains, particularly for small and medium-sized enterprises operating within platform-mediated environments.

Productivity gains may propagate unevenly across multiple layers of digital ecosystems. Organizational complements, measurement limitations, and data aggregation dynamics can create divergence between improvements observed at the task level and outcomes realized at the firm level. At the same time, platform infrastructures capable of aggregating cross-firm data may experience accelerated learning effects that amplify productivity gains at the ecosystem level (Brynjolfsson et al., 2017; Noy & Zhang, 2023).

Understanding these multi-level dynamics is essential for explaining how algorithmic technologies reshape the distribution of economic benefits across firms, platforms, and markets. Digital competition increasingly unfolds within ecosystems where algorithmic coordination, data aggregation, and infrastructural governance jointly determine how value is created and captured.

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