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Transaction cost economics: Lessons from past reforms and potential for the digital economy

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Abstract

Transaction cost economics (TCE) and the theory of governance structures developed by Oliver Williamson have demonstrated significant explanatory power across institutional economics, law and economics, public policy, and strategic management. This review evaluates the predictive potential of TCE in light of profound changes in industry organization and market design, focusing on its relevance to reform processes. We compare two major historical experiences: the liberalization of infrastructure network industries (electricity, gas, rail, and telecommunications) and the privatization of state-owned enterprises in post-socialist economies, with particular attention to Russia. While the reform trajectories differed, both cases reveal the risks of neglecting asset specificity, institutional constraints, and transaction hazards, which are core concepts in TCE. Where reforms evolved through adaptive governance and coordinated institutional development, outcomes were more resilient and efficient. In contrast, rushed transitions lacking governance capacity produced systemic inefficiencies. Drawing from these experiences, we explore emerging challenges in the regulation of digital platforms and ecosystems. We argue that digitalization alters transaction costs, expands strategic interdependencies, and gives rise to hybrid forms of platform governance. These developments underscore the need to reinterpret past lessons for new institutional contexts, particularly in areas such as labor classification, competition policy, and algorithmic regulation.

Keywords: Oliver Williamson, new institutional economics, transaction cost economics, governance structure theory, liberalization, digital platforms, digital ecosystems, artificial intelligence.
JEL classification: B52, D02, P11.

1. Introduction

The award of the 2009 Nobel Prize in economics to Oliver E. Williamson and Elinor Ostrom represented a rare moment of convergence among economists

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and social scientists, reaffirming a shared foundation across disparate research traditions. Fifteen years on, Williamson's contributions — particularly his theory of transaction cost economics (TCE) — remain deeply influential, shaping interdisciplinary inquiry in economics, law, and management. From law and economics to organizational theory, from strategic management to marketing, and from comparative economics to international business, TCE has become an indispensable lens for understanding how institutions and governance structures emerge, evolve, and interact — especially in the realm of public policy.

Even a quarter-century ago, many economists held that virtually no substantive question in economics lay beyond the reach of transaction cost analysis (Masten, 2022). While that claim may overstate the case, there is little doubt that TCE now figures centrally in any rigorous regulatory impact assessment: it systematically evaluates how legal rules and policy proposals reshape the costs of contracting, enforcement, and ultimately, the allocation of resources.

At its core, TCE dissolves the rigid dichotomies of "firm vs. market" and "regulation vs. free market", treating each as simply different institutional solutions to the same underlying problem: economizing on transaction costs. Under Williamson's framework, regulation is not antithetical to markets; rather, it is one governance choice among many, invoked when neither market nor hierarchical arrangements can adequately safeguard against contractual hazards (Williamson, 1985). Crucially, TCE embeds a temporal dimension into its comparative institutional analysis, recognizing that economic actors adopt incomplete contracts not only to govern current exchanges but also to adapt to unforeseeable future contingencies. By demonstrating the impracticality of any "ideal" governance structure, Williamson relieved private parties — and by extension, policymakers — of the Sisyphean task of comparing every proposal to a hypothetically perfect benchmark. Instead, they need only identify governance structures that economize effectively on transaction costs under prevailing conditions.

Williamson (1998) further distinguishes between first-order and second-order economizing. This dual perspective underscores the enduring responsibility of legislators: the rules they set today will steer decentralized decision-making for decades to come. Finally, TCE highlights the fragility inherent in a complex web of contracts among independent owners. Any regulatory intervention into existing arrangements must therefore satisfy stringent "remediableness" criteria, demonstrating both the absence of a feasible superior alternative and a net gain relative to the status quo.

The true test of any theory lies in its practical application. Here, we focus on how the insights of TCE have informed reforms at Williamson's second level (the institutional environment) and third level (governance structures) of the institutional hierarchy (Williamson, 1998). As early as 1991, Paul A. Joskow observed that:

> "Transaction cost economics clearly represents a rich and useful framework for understanding a wide variety of issues that arise in antitrust and public utility regulatory policies. However, my sense is that the large body of theoretical and empirical work that has accumulated over the last 15 years has so far had only a modest effect on public policy in these areas" (Joskow, 1991, p. 79).

Building on this critique, our article examines the extent to which Williamson's TCE and governance structure theory have actually shaped economic policy and legislative reforms in sectors undergoing profound transformation — where existing governance arrangements are disrupted or dismantled. Worldwide experiences with vertical separation (unbundling) and liberalization in telecommunications, electricity, gas, and rail industries provide vivid case studies in large-scale institutional redesign. Similarly, the post-socialist transition — marked by widespread privatization and market liberalization — offers another vantage point on the challenges of rebuilding governance frameworks from the ground up.

Despite variation in the timing and scope of these reforms, a consistent lesson emerges: the sooner — and with the greater care — policymakers account for transaction-cost effects on both incumbent and emerging organizational forms, the fewer unintended consequences they will face and the more fully they can capture efficiency gains. Today, digital platforms have become the preeminent focus of regulatory attention. Yet many of the legal and economic consequences of platform regulation remain uncertain, and the stakes are high. Drawing on past experience in network-industry reform, we argue that a transaction-cost lens can help avoid repeating earlier missteps.

The article is structured as follows. Section 2 outlines the conceptual framework based on TCE and governance structure theory, along with the methodology used to analyze reforms. Section 3 examines partially learned lessons from liberalization in network industries, while Section 4 focuses on missed lessons from post-socialist privatization. Section 5 turns to the institutional challenges posed by digital platforms, and Section 6 analyzes recent competition policy responses to digital ecosystems. Section 7 explores upcoming governance challenges in the context of artificial intelligence and expanding digital infrastructures. Finally, Section 8 synthesizes the findings into a comparative framework of lessons learned, missed, and still emerging, with implications for future reform design.

2. Conceptual framework and methodology

Williamson's contribution to the new institutional economics (NIE) lies in transforming Ronald Coase's insight on transaction costs into an operational framework for analyzing the efficiency of different organizational forms, thereby expanding and enriching TCE. While Coase (1937, 1960) identified that transaction costs help explain the existence of firms alongside markets, Williamson developed a comparative, microanalytic theory of governance structures that classified them into markets, hierarchies (firms), and hybrids (interfirm arrangements such as long-term contracts and alliances). He introduced the concept of "second-order economizing," where the choice among governance structures is guided by minimizing transaction costs through the alignment of these structures with the attributes of specific transactions, while taking into account laws and regulations — the "formal rules of the game" (Williamson, 1998).

Three core transactional attributes determine governance choice: *asset specificity*, *uncertainty*, and *frequency*. Asset specificity refers to how much value an investment loses if redeployed outside a particular transaction; high specificity increases mutual dependence and the risk of opportunism, especially through *hold-up problems* — situations where one party may exploit its bargaining power

after specific investments have been made, extracting rents by threatening to withdraw cooperation. Uncertainty relates to the unpredictability of future conditions, making it difficult to fully specify and enforce contracts ex ante. This often necessitates reliance on *relational contracts*, informal agreements sustained by ongoing interactions and mutual trust rather than formal legal enforcement, to mitigate risks of opportunism under uncertainty. Frequency concerns how often a transaction recurs, which affects whether it is worthwhile to invest in specialized governance mechanisms. When transactions involve high specificity and uncertainty, markets become inefficient, and hybrids or hierarchies are preferred for their stronger safeguards and coordination capabilities (Williamson, 1985, 1998).

Williamson embeds this framework within a broader *four-level model of social analysis* that organizes institutional and economic decision-making across different time scales and mechanisms. Level 1, social embeddedness, includes deeply rooted informal institutions such as norms, culture, and traditions that evolve slowly over centuries. Level 2, the institutional environment, consists of formal rules like property rights, laws, and constitutions, enforced by courts and bureaucracies; it defines the "rules of the game" and shapes feasible governance options. Level 3, governance, concerns how transactions are structured and executed using markets, hybrids, or hierarchies — this is where TCE operates most directly, aiming to align governance structures with transaction characteristics through second-order economizing. Thus, the latter assumes the institutional environment (Level 2) as given and focuses on selecting or designing governance structures (Level 3) that most effectively mitigate transaction hazards under those conditions. Level 4, resource allocation and employment, deals with marginal efficiency, incentive structures, and pricing decisions — functions central to neoclassical and agency theory, referred to as third-order economizing. Each level imposes constraints on the level below, creating a nested, interdependent system of economic organization (Williamson, 1998).

Materials and methods. This study employs a qualitative and comparative methodology as well as methodological approaches from the new institutional economics, specifically TCE and the governance structure theory. The aim is to assess how well these theoretical frameworks explain the outcomes of structural reforms in various economic sectors across time and geography, and to evaluate their applicability to the evolving domain of digital platforms and ecosystems.

The research methodology incorporates several complementary methods:

- comparative institutional analysis to contrast governance structures across sectors and historical contexts;
- thematic content analysis of empirical studies to identify patterns of alignment or misalignment between transaction characteristics and institutional arrangements;
- case study synthesis, drawing on sector-specific reform experiences to distill policy-relevant lessons.

The information base for the study is built upon a broad set of empirical works documenting liberalization reforms in traditional network industries — electricity, natural gas, rail, and telecommunications — as well as privatization reforms in Russia and other former Soviet Union (FSU) countries. In total, the study synthesizes insights from more than 120 empirical studies covering reforms in more than 90 countries across 5 continents (United States, EU countries, Latin American

countries, India, China, Russia and others), with data spanning from the early 1970s to 2025, and across different institutional contexts. Empirical data include quantitative evaluations of transaction-specific investment risks, regulatory asymmetries, performance outcomes of post-reform entities, and the evolution of market structures. Research on privatization reforms is based on the analysis of theoretical and empirical studies, as well as data from government agencies and analytical reports from international organizations dedicated to privatization reforms in Russia and other FSU countries.

This study also draws on a substantial body of empirical and theoretical research on digital platforms and algorithmically mediated ecosystems (analyzed through more than 70 scholarly sources). Applying the analytical lens of TCE and the governance structure theory, we examine how digitalization reconfigures the boundaries between firms, markets, and hybrids. We also assess the institutional and regulatory adaptations necessary to address transaction frictions, incentive misalignments, and emerging asymmetries of power within platform-based governance structures.

The analytical process proceeds in three stages:

1. Application of TCE to historical reform cases: Williamson's framework is used to examine whether governance structures were appropriately aligned with key transaction attributes such as asset specificity, frequency, and uncertainty, and whether institutional environments (laws, regulatory bodies) were supportive of this alignment.

2. Classification of lessons: Based on the empirical outcomes, the study categorizes lessons as partially learned (e.g., gradual adaptation of regulation during reforms in network industries), missed (e.g., weak governance in post-socialist privatization), or still emerging (e.g., regulatory design for digital platforms).

3. Forward-looking application: The study then explores how these lessons apply to current and future challenges posed by digital platforms and ecosystems. These are examined as emerging forms of governance that potentially transcend traditional market-hierarchy-hybrid classifications, due to their combination of algorithmic control, digital monitoring, and strategic center coordination.

The final output of the methodology is not only a typology of reform experiences but also a set of theoretically informed propositions for evaluating governance in digital markets. The study concludes with reflections on the potential need to define new governance structures that account for the distinctive characteristics of digital ecosystems, while cautioning that such classifications must be rooted in ongoing empirical observation and analysis.

In extending our study to digital platforms and ecosystems, we examine several contractual mechanisms commonly used by dominant platforms to govern inter-firm relationships and structure transactions. These mechanisms matter not only for competition law but also as tools of governance that reshape transaction costs and redefine market boundaries.

3. Lessons partially learned: Transaction governance and structural reform in network industries

As a result of the comparative institutional analysis and thematic synthesis described in the methodology, we have identified recurring governance problems

arising during liberalization, deregulation, and structural reforms across network industries in different countries and time periods. These issues, grouped by sector (using the electricity, gas, and railways sectors as examples), are summarized in Tables 1–3, with examples and supporting research. Each table highlights transactional failures, coordination breakdowns, and institutional mismatches interpretable through the lens of TCE and governance structures theory. The analysis shows how misaligned governance — due to overlooked asset specificity, institutional fragmentation, or coordination gaps — has often undermined reform efforts and led to inefficiencies. These sectoral insights underpin the lessons discussed in the conclusion.

The electricity sector is defined by high asset specificity, technological complexity, and acute coordination needs. Investments in generation, transmission, and distribution infrastructure are capital-intensive and irreversible, while real-time balancing between production and consumption introduces substantial uncertainty and interdependence between actors. These conditions amplify transaction costs and create structural asymmetries that complicate the introduction of market mechanisms, especially in segments with natural monopoly characteristics like transmission and distribution. Based on a broad analysis of empirical studies, Table 1 summarizes the core governance and transaction-related problems observed during electricity market liberalization in various countries, where poorly aligned governance structures — especially in the early stages — led to regulatory instability, coordination failures, weak competition, and unmet investment incentives, validating key predictions of Williamson's TCE framework.

The gas sector is similarly characterized by extreme capital intensity and long investment cycles, with infrastructure such as pipelines and storage facilities representing sunk costs that are highly transaction-specific. Geopolitical risk, technological lock-in, and dependence on long-term contracts compound uncertainty. Moreover, pipeline networks exhibit strong natural monopoly traits and require ongoing regulatory oversight. The combination of asset immobility and institutional heterogeneity has often impeded the effectiveness of liberalization, especially in countries where market reforms lacked strong governance safeguards. Table 2 highlights recurring structural and institutional failures in gas sector reforms across different jurisdictions, where the dominance of incumbent firms, inflexible contract models, and weak regulatory design reflect the consequences of ignoring asset specificity, institutional diversity, and transaction hazards — reinforcing the need for governance structures tailored to sectoral and country-specific contexts.

Rail transport is one of the most governance-intensive sectors due to extremely high asset specificity and complex interdependence between infrastructure and rolling stock. Investments in tracks, stations, and signaling systems are highly specialized and cannot be repurposed without substantial loss, leading to sunk costs and long payback periods. In fragmented systems, coordination failures between infrastructure managers and operators increase opportunism and conflict. These features make pure market solutions ill-suited, often requiring hybrid or hierarchical governance structures — especially where safety, standardization, and public service obligations are involved. Table 3 presents the main challenges encountered in rail and transport infrastructure reforms, where vertical unbundling and market liberalization often produced unintended inefficiencies,

Table 1
Overview of the problems of liberalization reforms in the electricity sector.

Key issues of reforms	Regions / countries	Time period	Research
High market concentration and monopoly dominance (dominance of vertically integrated companies, entry barriers, limited network access, inefficient unbundling, network bottlenecks)	North and Latin America, EU, UK, Asia, other countries	1970s–2020s	Schmalensee and Golub (1984), Steen (2003), Capobianco (2005), Joskow (2008), Correljé and De Vries (2008), Weigt (2009), Erdogdu (2010), Grilli (2010), Stagnaro et al. (2020), Santos et al. (2021), Fatras et al. (2022)
Insufficient investment incentives and unstable revenues (short-term signals, regulatory uncertainty, revenue volatility, lack of risk hedging instruments)	North and Latin America, EU, UK, Asia, Africa, other countries	1980s–2020s	Larsen et al. (2004), Joskow (2006, 2008, 2022), Weigt (2009), Jamasb et al. (2015), Roques and Finon (2017), Bhattacharyya (2019), Dertinger and Hirth (2020), Guerriero (2020), Fatras et al. (2022), Morrison (2022)
Coordination failures and system fragmentation (governance misalignments across generation, transmission, and retail, governance fragmentation and imbalance)	North and Latin America, EU, UK, Asia, other countries	1980s–2020s	Joskow (2006), Weigt (2009), Roques and Finon (2017), Bansal (2017), Urpelainen et al. (2018), Bhattacharyya (2019), Fatras et al. (2022), Morrison (2022), Pereira et al. (2023)
Weak competition, market immaturity (strategic bidding behavior, low player participation, market manipulation)	North and Latin America, EU, other countries	1980s–2020s	Borenstein et al. (1999), Woo et al. (2003), Cicchetti et al. (2004), Mirza and Bergland (2016), Zhao and Zhu (2024)
Weak or politically dependent regulators, political and regulatory issues (lack of autonomy, political interference, inconsistent enforcement, political resistance)	North and Latin America, EU, UK, Asia, Africa, other countries	1980s–2020s	De Almeida and Pinto (2004), Singh (2006), Erdogdu (2010), Pollitt (2012a, 2012b), Jamasb et al. (2015), Rodríguez Padilla (2016), Bansal (2017), Shin and Managi (2017), Bhattacharyya (2019), Guerriero (2020), Santos et al. (2021), Morrison (2022), Pereira et al. (2023)
Inefficient and non-transparent pricing and tariff policies; rising costs (price rigidity, cross-subsidies, cost misallocation)	North America, EU, UK, Asia, other countries	1990s–2020s	Domah and Pollitt (2005), Grilli (2010), Bansal (2017), Guerriero (2020), Santos et al. (2021), Fatras et al. (2022), Joskow (2022), Zhao and Zhu (2024)
Institutional and social barriers (weak institutions, affordability issues, infrastructure gaps, electricity theft, weak payment culture, corruption)	North and Latin America, EU, UK, Africa, Asia, other countries	1980s–2020s	Singh (2006), Jamasb et al. (2015), Bansal (2017), Urpelainen et al. (2018), Bhattacharyya (2019), Dertinger and Hirth (2020), Fatras et al. (2022), Joskow (2022), Morrison (2022)
Consumer inertia and low engagement (high switching costs, low awareness, limited alternatives)	North and Latin America, EU, Asia, other countries	1990s–2020s	Bansal (2017), Shin and Managi (2017), Stagnaro et al. (2020)
Market model misfit for new technologies (inflexibility of liberalized models to accommodate intermittent and decentralized sources)	North and Latin America, EU, Africa, other countries	1990s–2020s	Roques and Finon (2017), Joskow (2022), Fatras et al. (2022), Morrison (2022), Pereira et al. (2023)

Source: Compiled by the authors.

Table 2
Overview of the problems of liberalization reforms in the gas sector.

Key issues of reforms	Regions / countries	Time period	Research
Dominance of large companies, limited third-party access to networks (entry barriers, monopolized infrastructure, classic governance bottleneck, lack of access safeguards)	North and Latin America, EU, Middle East, Asia, other countries	1980s–2020s	World Bank (1999), Beato and Fuente (2000), Cavaliere (2007), Haase (2008), Talus (2014), Ishwaran et al. (2017), IEA (2019), Demir (2020), Kumar et al. (2020), Diaz (2021), Pereira et al. (2023), Babatunde et al. (2024), Mohammad et al. (2024)
Regulatory fragmentation and inflexibility, poor institutional coordination, market inefficiencies (conflicting authority layers, transaction governance undermining, increased enforcement costs, market and price manipulation)	North and Latin America, EU, Middle East, Asia, other countries	1980s–2020s	Marston (1997), Jackson (2005), Mulder et al. (2006), Haase (2008), Grätz (2009), Slabá (2009), Reverdy (2010), Ishwaran et al. (2017), Kar and Gupta (2017), IEA (2019), Dodge (2020), Najicha (2021), Diaz (2021), Chow and Rincon-Romero (2022), Romeiro and Amorim (2022), Delalibera et al. (2023), Pereira et al. (2023), Babatunde et al. (2024), Mohammad et al. (2024)
Vertical integration, role conflicts between operators and regulators (boundary blurring of control, second-order economizing hindrance, enforcement issues)	Latin America, EU, North America, Middle East, Africa, Asia, other countries	1980s–2020s	World Bank (1999), Beato and Fuente (2000), Cavaliere (2007), Haase (2008), Westphal (2014), Ishwaran et al. (2017), Demir (2020), Kumar et al. (2020), Romeiro and Amorim (2022), Delalibera et al. (2023), Babatunde et al. (2024), Mohammad et al. (2024)
One-size-fits-all reform models that ignore sectoral and institutional specificity (lack of transaction-specific governance design, misalignment with local institutional environment)	North and Latin America, EU, Africa, Asia, other countries	1980s–2020s	World Bank (1999), Mulder et al. (2006), Haase (2008), Brakman et al. (2009), Slabá (2009), Talus (2014), Westphal (2014), Najicha (2021), Chow and Rincon-Romero (2022), Hafner and Luciani (2022), Babatunde et al. (2024), Mohammad et al. (2024)
Institutional and regulatory barriers, inflexible contracts, absence of liquid trading hubs, high asset specificity, inflexible, non-transparent and inefficient pricing (increased switching costs, renegotiation hazards due to rigid long-term contracts)	North and Latin America, EU, Africa, Asia, other countries	1980s–2020s	Marston (1997), World Bank (1999), Jackson (2005), Grätz (2009), Reverdy (2010), Ishwaran et al. (2017), Kar and Gupta (2017), IEA (2019), Demir (2020), Dodge (2020), Kumar et al. (2020), Najicha (2021), Diaz (2021), Hafner and Luciani (2022), Romeiro and Amorim (2022), Delalibera et al. (2023), Pereira et al. (2023), Babatunde et al. (2024), Mohammad et al. (2024)
Infrastructure constraints and fragmentation, insufficient investment incentives, dependency on imports (transaction vulnerabilities due to network bottlenecks, energy security risks)	North and Latin America, EU, Africa, Asia, other countries	1980s–2020s	Mulder et al. (2006), Brakman et al. (2009), Grätz (2009), Slabá (2009), Reverdy (2010), Talus (2014), Westphal (2014), Ishwaran et al. (2017), IEA (2019), Demir (2020), Diaz (2021), Chow and Rincon-Romero (2022), Hafner and Luciani (2022), Delalibera et al. (2023), Pereira et al. (2023), Babatunde et al. (2024), Mohammad et al. (2024)
Weak reform legitimacy, social and political resistance (public distrust, regional resistance, asymmetric benefit distribution, political hazards)	Asia, other countries	1990s–2020s	Jackson (2005), Haase (2008), Najicha (2021), Chow and Rincon-Romero (2022), Babatunde et al. (2024)
Lack of regulator independence and tariff transparency (non-autonomous oversight, lack of opacity and credible commitments, high transaction risks)	Latin America, EU, Asia, other countries	1980s–2020s	Beato and Fuente (2000), Mulder et al. (2006), Kar and Gupta (2017), IEA (2019), Demir (2020), Kumar et al. (2020), Najicha (2021), Mohammad et al. (2024)

Source: Compiled by the authors.

Table 3
Overview of the problems of liberalization reforms in the rail sector.

Key issues of reforms	Regions / countries	Time periods	Research
Dominance of large companies, vertical integration, discrimination against new entrants, risks of re-monopolization (incumbents' advantages, entry barriers, formal liberalization)	EU, North and Latin America, Asia, other countries	2000s–2020s	Ellig (2002), Pittman (2004, 2005), Bouf et al. (2005), Cantos et al. (2012), Laabsch and Sanner (2012), Ozkan et al. (2016a), Huang et al. (2019), Kuriakose and Gupta (2021), Solina and Abramović, (2022)
Coordination loss after vertical separation and rising transaction costs (functional unbundling, interface cost increases, role of duplication, operational friction)	North America, EU, UK, Asia, other countries	1990s–2020s	Pittman (2004, 2005), Bouf et al. (2005), Cantos Sánchez et al. (2008), Wetzel (2008), Król (2009), Cantos et al. (2012), Laabsch and Sanner (2012), Velde et al. (2012), Nash et al. (2014), Mizutani et al. (2015), Ozkan et al. (2016a, 2016b), Abbott and Cohen (2017), Huang et al. (2019), Kuriakose and Gupta (2021), Shrivastva (2021), Solina and Abramović (2022), Moyano and Dobruszkes (2025)
Weak institutional coordination, incompatibility of national models (governance misalignments, lack of regulatory harmonization across jurisdictions, market integration limitations, system fragmentation)	EU, Africa, Asia, other countries	2000s–2020s	Bouf et al. (2005), Pittman (2004, 2005), Velde et al. (2012), Nash et al. (2014), Bošković and Bugarinović (2015), Mizutani et al. (2015), Ozkan et al. (2016a, 2016b), Abbott and Cohen (2017), Huang et al. (2019), Kuriakose and Gupta (2021), Shrivastva (2021), Solina and Abramović (2022)
Insufficient independence and weak capacity of regulators (regulatory autonomy deficits, enforcement tool shortages)	EU, India, Africa, Asia, other countries	2000s–2020s	Pittman (2004), Król (2009), Nash et al. (2014), Ozkan et al. (2016a, 2016b), Shrivastva (2021)
Financial fragility and subsidy dependence of infrastructure firms (low cost recovery, regulatory constraints, investment deterrence, autonomy reduction)	EU, Africa, Asia, other countries	1990s–2020s	Velde et al. (2012), Ozkan et al. (2016a), Huang et al. (2019), Kuriakose and Gupta (2021), Solina and Abramović (2022), Moyano and Dobruszkes (2025)
Institutional barriers and inertia, resistance to reforms (governance adaptation delays, labor rigidity, legacy agreements, bureaucratic resistance)	North America, Africa, Asia, other countries	1960s–2020s	MacDonald and Cavalluzzo (1996), Bouf et al. (2005), Cantos Sánchez et al. (2008), Wetzel (2008), Król (2009), Nash et al. (2014), Mizutani et al. (2015), Ozkan et al. (2016a), Abbott and Cohen (2017), Huang et al. (2019), Kuriakose and Gupta (2021), Shrivastva (2021), Solina and Abramović (2022), Moyano and Dobruszkes (2025)
Network fragmentation and inefficient resource allocation (regional grid disconnection, coordination obstacles, planning inefficiencies, scalability limitations)	North and Latin America, EU, UK, Asia, Africa, other countries	1990s–2020s	Ellig (2002), Pittman (2004, 2005), Cantos Sánchez et al. (2008), Wetzel (2008), Velde et al. (2012), Bošković and Bugarinović (2015), Mizutani et al. (2015), Ozkan et al. (2016a, 2016b), Abbott and Cohen (2017), Huang et al. (2019), Kuriakose and Gupta (2021), Solina and Abramović (2022), Moyano and Dobruszkes (2025)
Rigid contract and tariff models, problems with pricing (contract complexities, problems with tariff methodologies, short-termism, opaque access terms, cross-subsidies, contestability restrictions)	North America, EU, other countries	1990s–2020s	Ellig (2002), Cantos Sánchez et al. (2008), Król (2009), Velde et al. (2012), Bošković and Bugarinović (2015), Ozkan et al. (2016a), Huang et al. (2019), Shrivastva (2021), Solina and Abramović (2022), Moyano and Dobruszkes (2025)
Decline in investment incentives, low profitability (sunk costs, policy uncertainty, limited returns, private sector engagement deterrence, incentive mismatch)	EU, UK, Asia, other countries	1980s–2020s	Bouf et al. (2005), Pittman (2005), Król (2009), Laabsch and Sanner (2012), Velde et al. (2012), Nash et al. (2014), Mizutani et al. (2015), Ozkan et al. (2016b), Abbott and Cohen (2017), Kuriakose and Gupta (2021), Solina and Abramović (2022)

Source: Compiled by the authors.

rising transaction costs, and fragmented regulatory oversight — demonstrating how misaligned governance arrangements can undermine reform outcomes when the coordination needs of high-specificity assets are underestimated.

The underlying institutional dynamics of these problems can be better understood in the historical context of reform waves that began in the mid-1980s. Mounting welfare losses under rate-of-return and cost-plus regulation — as well as the entrenched resistance of vertically integrated incumbents in so-called "natural monopoly" sectors — spurred a global wave of competition-promoting reforms in telecommunications, electricity, and gas (Laffont and Tirole, 2001). At the heart of these reforms lay the principle of vertical separation: assets exhibiting "natural monopoly" traits (notably, significant economies of scale and scope) were split off from those deemed potentially competitive.

Across countries and sectors, the extent of unbundling differed markedly. In some jurisdictions, regulators imposed full separation, barring the upstream, natural-monopoly operator from any involvement in downstream competitive activities. Elsewhere, a third-party access regime prevailed: the incumbent continued to own and operate downstream assets but was mandated — under regulated, non-discriminatory terms — to grant competitors access to its network infrastructure. To counteract incumbent market power, retail-price controls were dismantled and replaced — ideally — by spot markets that signal real-time shifts in supply and demand. In parallel, dedicated capacity markets emerged to guide investment decisions by reflecting the true opportunity cost of network resources.

Over the past forty years, these liberalization efforts have constituted arguably the largest experiment in transaction governance ever undertaken. Even in the early stages, Joskow — one of the foremost advocates for applying TCE to utility reform — warned that:

> "It is clear to me that the analysis of structural and regulatory reform proposals for the electricity, natural gas and telephone industry would benefit enormously if an incomplete-contracts/transaction-cost framework was adopted. Unfortunately, a paradigm is often adopted that ignores many of the characteristics of transactions in these industries that lead firms to bring transactions inside the firm or to enter into complex contractual arrangements. The end result is likely to be bad policy choices" (Joskow, 1991, p. 73).

A decade later, he reiterated this concern:

> "…while transaction cost economics has played a role in the debates about vertical restructuring in these industries, and the precise form that such restructuring would take, it is my sense that the direct role of transaction-cost considerations in influencing the direction of public policy has, so far, been quite modest" (Joskow, 2002, p. 314).

From the perspective of the NIE, network industries — whether in telecommunications, electricity, gas supply or rail — are characterized by long-lived, highly specific assets (such as site and physical-asset specificity, as well as temporal and other specificities), and by the necessity of rigid, often complex, contractual arrangements to govern their use and maintenance. These industries also face

considerable technological and demand-side uncertainties. For short-term market contracts to be viable — which is a hallmark of competitive markets — governance structures must align incentives between asset owners and include robust adjustment mechanisms in order to respond to and adapt to unforeseen circumstances.

TCE suggests that the greater the asset specificity, the stronger the case for hierarchical governance (i.e., vertical integration), which can internalize risks and streamline coordination. However, when vertical integration persists — such as in cases of partial unbundling — competition policy faces heightened complexity. Integrated firms often have both the means and the motive to foreclose market entry, manipulate access conditions, or otherwise distort competition in adjacent markets. As a result, policymakers must weigh the trade-offs between static efficiency gains from market liberalization and the dynamic governance costs of disrupting integrated structures.

However, vertical separation without adequate governance mechanisms can impede the effective utilization of new resources due to the risk of hold-up. Both asset owners in the network infrastructure segments — typically natural monopolies — and those in downstream segments, whether competitive or potentially so, face this risk, affecting incumbents and new entrants alike. Regulators often set access prices and rules that undervalue essential network services. This undermines incumbents' incentives to expand their networks. Empirical studies, such as Cave et al. (2019), document underinvestment in telecommunications stemming from regulated access fees and interconnection procedures.

From the perspective of the network owner, regulatory hold-up may manifest as asymmetric obligations imposed on upstream and downstream market participants. The California electricity crisis of 2000–2001 exemplifies this problem (Joskow, 2001): wholesale electricity prices were deregulated, forward hedging contracts were prohibited, yet retail prices remained regulated. This imbalance shifted the entire burden of market risks onto distribution companies, thereby disrupting the coordinated adaptation necessary between electricity producers and distributors.

Such exposure to contractual and regulatory hazards threatens the long-term development and sustainability of network infrastructure. For new entrants, the hold-up threat often frustrates the short-term objectives of liberalization and competition policies in network industries. While regulators create increasingly complex sector-specific access rules, these measures cannot fully eliminate contractual hazards inherent in incomplete contracting. Underestimating the TCE implications leads to interrelated problems that ultimately constrain competition in the sector — for example, local market power and congestion management in electricity markets (Joskow, 2002), or challenges in the rail sector under vertical separation (Pittman, 2005).

To address these governance gaps during liberalization in network industries, legislators and industry participants have endeavored to establish appropriate contractual and regulatory frameworks enabling independent owners to negotiate and enforce agreements effectively. Consistent with Williamson's insights, the diversity of contractual and regulatory approaches across countries has been significant from the outset and shows little convergence toward a unified model even today.

Unsurprisingly, researchers have long developed classification schemes for reforms based on varying criteria relating to private and public ordering. These

classifications aim to explain the cross-jurisdictional diversity observed in the evolution of network industries, but they remain complex and often fundamentally different from one another.

Levy and Spiller (1994) examine how the institutional environment shapes a telecommunications regulator's ability to credibly commit to investors while retaining sufficient flexibility to adapt policies. Their "Decision-tree" model captures the key attributes of legislative, executive, and judicial power within a country. The authors' position aligns with Williamson's ideas, asserting that the institutional environment conditions the balance between public and private ordering needed to foster competition and attract new market entrants. In particular, in economic systems with different types of institutional environments — between those that include many checks and balances and those that give discretionary power to one of the political actors — regulatory approaches should be implemented using different instruments.

In the early phase of electricity market liberalization in the European Union, Arentsen and Künneke (1996) distinguished among several industrial coordination systems by examining each sector's prevailing allocation mechanism, ownership structure, contractual arrangements, decision making unit, and entry barriers — and by linking these dimensions to corresponding regulatory regimes. Applying this framework to the electricity industries of the Netherlands, Germany, Great Britain, and France, they showed that each country embodied a distinctive mix of coordination patterns and regulatory priorities, which in turn produced divergent paths toward liberalization. Crucially, Arentsen and Künneke (1996) argue that there is no universal blueprint: the most effective coordination architecture must be identified empirically, with close attention to the specific institutional setting in each national context.

Glachant et al. (2008) document the successful operation of a negotiated, rather than strictly regulated, third-party access regime in Germany, which remained in place for over a decade. Their findings underscore the power of private ordering — so long as market participants face the credible prospect of regulatory intervention should self-regulation falter. Although recent EU efforts to forge a single electricity market have narrowed cross-national regulatory differences (Pollitt, 2019), member states still serve as valuable "laboratories" for testing diverse institutional designs.

Turning to gas markets, Glachant et al. (2014) offer a nuanced classification of open access models based on how property rights are allocated and enforced — rights such as injection, withdrawal, pressure control, network management, exclusion, and alienation — between different user groups and the regulated network operator. They demonstrate how both underestimation and overestimation of specific types of transaction costs across these rights can lead to substantial inefficiencies, whether through underinvestment, congestion, or distorted price signals.

The wide range of institutional and contractual arrangements of varying efficiency in network industries supports Williamson's key insight that governance structures can only be evaluated in relation to available alternatives. Similar outcomes may arise from very different actions taken by governments, regulators, and market participants. Conversely, comparable institutional settings may produce varying results depending on the governance choices of private actors

and regulators, just as similar governance choices can yield different outcomes under differing institutional environments.

Regardless of regulators' and market participants' initial grasp of transaction governance issues at the outset of liberalization in network industries, half a century of "economizing" by governments and companies has given rise to private and public ordering, introducing new instruments for coordinating both day-to-day operations and investment decisions. These coordination tools rely heavily on hybrid and, in some cases, hierarchical governance structures (Joskow, 2022). Liberalization as "market-building" became, to a large extent, a governance-building process. This is precisely why the insights of governance structure theory were underestimated during the reform process (see Joskow, 1991, 2002). Finally, the constantly evolving policy agenda has prevented many of these recommendations and conclusions from becoming established classics.

4. Lessons missed: Privatization and market-oriented reform in post-socialist economies

Liberalization and privatization in Russia and other FSU countries are widely regarded as among the most profound failures of post-socialist economic reforms. It is striking that institutional economics has paid relatively little attention to the institutional mechanisms underlying this failure, and even more surprising that IE has contributed almost nothing to the comparative analysis of Russian and Chinese liberalization reforms from the perspective of governance structures.

The widespread opinion is that Russian privatization was the best that was politically and administratively feasible (supporting works cited by Brown et al., 2013). Whether this statement is correct or not, the average decline in manufacturing productivity (Brown et al., 2013), followed by deindustrialization, requires explanation and interpretation.

An explanation of deindustrialization and the sharp decline in Russian GDP through the lens of asset specificity was developed by Blanchard and Kremer (1997). Their aptly titled article, "Disorganization", demonstrates that once the previous governance structures were dismantled, the combination of asset specificity, incomplete contracts, and asymmetric information led to severe output losses. As they put it:

> "Specificity together either incompleteness of contracts or asymmetric information, can lead to large output losses… the effects depend both on the degree on specificity… and on complexity of production process… [because] the mechanisms used in the West to deal with specificity take time to develop and have therefore played a limited role in transition" (Blanchard and Kremer, 1997, p. 1094).

Blanchard and Kremer were among the first to highlight how the absence or underdevelopment of both formal and informal institutions undermined the efficiency of private ordering in the face of high asset specificity. This insight is fully aligned with the predictions of TCE: when the institutional environment

cannot support credible contractual safeguards, economic agents are pushed toward more vertically integrated governance structures (Blanchard and Kremer, 1997). Indeed, the wave of vertical integration that followed in Russia — both through private initiatives and as part of public policy — served to confirm this dynamic. Later studies showed that the formation of large, integrated enterprises had a positive impact on the performance of their subsidiaries (Estrin et al., 2009).

However, almost complete absence of viable hybrid forms of governance in the 1990s not only led to significant efficiency losses, but also stifled incentives to invest in assets with positive specificities. At the firm level, this institutional void obstructed the kind of restructuring necessary to restore competitiveness and enable long-term growth.

By the end of the 1990s, there was broad consensus that the failure of market-oriented reforms in Russia and other FSU countries stemmed not from a lack of radicalism, but from a fundamental misunderstanding of the nature of markets themselves. In his keynote address at the 1999 Annual World Bank Conference on Development Economics, Joseph Stiglitz — later awarded the Nobel Prize in economics — sharply criticized those who blamed the reforms' failures on their insufficient boldness. Comparing Russia's economic collapse and rising inequality to China's steady and successful growth trajectory, he remarked:

> "The failures of the reforms go far deeper — to a misunderstanding of the very foundations of a market economy and a failure to grasp the fundamentals of reform processes…" (Stiglitz, 1999, p. 30).

Stiglitz's critique was directed at the "Arrow–Debreu" mindset embraced by many of the reformers and their Western advisors in Russia. This theoretical framework, based on the assumptions of complete markets and frictionless contracting, ignored the fundamentally different institutional realities of a transition economy compared to a mature market economy — particularly in areas such as financial contracts, banking systems, regulatory oversight, and corporate governance. According to Stiglitz, this blind spot helps to explain the disappointing outcomes of privatization in Russia, which failed to establish effective corporate governance or create the right incentives for firm-level restructuring.

Whereas Blanchard and Kremer focused on inter-firm coordination failures arising from asset specificity and institutional breakdown, Stiglitz emphasized agency costs and intra-firm decision-making. Despite these different emphases, both perspectives converge on a key insight: the institutional infrastructure necessary for effective private ordering — whether between firms or within them — was severely underdeveloped in post-Soviet Russia.

More than two decades later, has the theory of market-oriented reform — or more broadly, the theory of transition from socialism to a market economy — fully addressed this earlier failure to grasp the transformation of governance structures? In our view, only partially. One meaningful advance is the recognition that socialist systems did, in fact, include functioning institutions that extended well beyond a simplistic model of central planning (Murrell, 2005). However, further theoretical progress is constrained by two main limitations.

The first is a continued tendency toward binary thinking — overly rigid dichotomies such as "state vs. market" or "plan vs. private initiative". The second

is the imposition of excessively high standards of empirical proof, which tend to limit the depth of institutional analysis, especially when it comes to country-specific features. The prevailing methodology, dominated by cross-country comparisons, often focuses on measuring aspects like bureaucratic quality, rule of law, managerial accountability, impersonal trust, corruption risk, and regulatory burden — primarily through survey data. While these indicators may yield useful information, they have limited capacity to explain the institutional mechanisms that underpin specific transactions or transactional systems.

In this context, the conceptual understanding of China's institutional system has seen relatively little advancement since Stiglitz (1999) analysis. As he observed:

> "In choosing a path to a market economy, they [the Chinese] opted for the path of incrementalism ('crossing the river by groping for stones') and non-ideological pragmatism ('the question is not whether the cat is black or white but whether it catches mice')… Chinese policymakers had the wisdom to know that they did not know what they were doing, so they did not jump off a cliff after being assured by experts that they would clear the chasm in just one more great leap forward" (Stiglitz, 1999, pp. 47–48).

Indeed, China's transition remains something of an enigma — and a notable exception for TCE. The *Advanced introduction to new institutional economics* (Ménard and Shirley, 2022) explicitly treats China as a deviation from the conventional rule that sustained economic growth requires a strong legal system and tight constraints on state power. The authors explain this anomaly by referencing a widely accepted view among scholars: that a variety of *informal institutions* have enabled China's rapid development, despite weak formal safeguards such as the rule of law (Ménard and Shirley, 2022).

Among the conditions that support the functioning of the informal institutions are the decentralization of administrative functions, a high degree of competition among diverse localities — each incentivized to improve performance at the provincial level to attract investors — and dense networks of private entrepreneurs bound by shared strong social norms. These are the factors identified by Coase and Wang (2012), who also emphasize that Chinese governments, in their policy decisions, often satisfy Williamson's criteria of remediableness — offering evidence of ongoing institutional improvement.

Murrell (2005) also points out that the transition experience has elevated the role of institutions in economic development. Yet, the direct influence of institutional economics on transition policy has been less significant than one might expect. Several factors help explain this.

First, most studies are limited to one level of institutional analysis. However, Williamson's framework for institutional analysis identifies four interrelated levels of analysis, each operating on different time scales and influencing the layers below (Williamson, 1998, 2000; see Section 2). As a consequence, deep economic reforms inherently require simultaneous changes across all layers. However, most studies focus on only one of these layers, often treating the others as fixed or exogenously specified in the analysis process.

Second, the pace of transition — particularly in the FSU countries — has often been too rapid. Successful transitions unfold over decades, allowing space

for incremental changes driven by competent policy decisions. The experience of a regulatory reform in network industries (e.g., electricity, gas, rail) further illustrates why governance structure theory has been underutilized in transition contexts. Improving governance and institutional quality is not an event but a process — one that depends on feedback, coordination between regulators and market participants, and a capacity for learning through trial and error. These lessons are especially relevant when applying governance structure theory to the new challenges produced by the digital economy and digital platforms.

So how can the insights from governance structure theory help governments in transition economies? First, reform efforts should move away from the simplistic narrative of a "transition from plan to market" and instead focus on the evolution from one type of hybrid governance structure to another. In Russia during the 1990s, governance itself was largely neglected. Privatization targeted assets rather than functioning enterprises, and in line with TCE, it was asset specificity — not technical quality — that best predicted economic collapse (see Stiglitz, 1999).

Second, reforms must follow the correct sequence. An evolutionary, institutionally informed approach requires that the legal and institutional foundations for private contracting — such as civil codes, commercial courts, and bankruptcy laws — be established and strengthened before reforms take place. If these foundational institutions are introduced only afterward, effective private ordering is likely to be obstructed.

5. The digital economy and digital platforms: New institutional challenges

The rise of digital economy and digital platforms pose significant challenges for both economic theory and legal practice. Digital technologies and multi-sided platform business models alter transaction costs in contracting (Golovanova et al., 2024) as well as the costs of control within firms. Characteristics and actions that were previously unobservable are now visible to counterparties and internal managers alike. Yet, there is still no clear consensus on how digital technologies affect the boundaries between firms and markets. As Nagle et al. (2024) observe:

> "…[emergence of digital traces that reveal the type of an agent] reduces the cost of contracting, potentially leading to less vertical integration and more economic activity in the market… [But there is increasing value of a bundle of personal data collected individually]. This is a form of higher asset specificity that will likely lead to more vertical integration and larger firms… Interestingly, increased reliance on digital transactions in the economy can, as seen through the lens of TCE, lead to both bigger firms… and an increase in transactions that occur via the market" (Nagle et al., 2024, pp. 5–6).

The business model of multi-stakeholder platforms is to create value for different user groups — either by facilitating direct contracting (e.g. marketplaces connecting buyers and third-party sellers), or by aggregating value from one user group to provide services to another (e.g., content creators and viewers; users and advertisers). Digital platforms vary widely in the degree they coordinate user interactions. Conventionally, at one end of the spectrum are classified platforms

that support decentralized contracting. At the other end of the spectrum are ride-hailing platforms which directly coordinate a wide range of driver actions.

The legal interpretation of contracts between such platforms and their professional users — platform workers (e.g., drivers or couriers) — is a critical issue for regulators — one where governance structure theory offers valuable insights. Whether platform workers should be classified as employees or independent contractors is one of the most contentious legal questions in the platform economy and demands careful application of the governance structure framework.

In particular, ride-hailing platforms not only set prices unilaterally (often using dynamic pricing), but also implement complex incentive schemes for drivers. The Russian platform Yandex Taxi, for example, employs a multifaceted performance-based incentive system for drivers that incorporates class of taxi services, driver ratings, order acceptance rates, driving safety, photo-based vehicle checks, and even fuel station preferences. This system incentivizes drivers to single-home and imposes both rewards and penalties based on historical and current performance. A cumulative rating determines whether a driver remains active or is temporarily (or permanently) excluded from the network. Moreover, platforms unilaterally define rules for dispute resolution between drivers and passengers, or between drivers and the central dispatch system (Geliskhanov, 2024). Digital technologies allow for comprehensive surveillance and control of drivers' behavior. Within a large driver network, issues of hidden actions (moral hazard) or hidden characteristics (adverse selection) are significantly reduced. Service quality becomes standardized, and driver ratings reflect this standardization — reinforcing network effects (Belleflamme and Peitz, 2021). This business model is not only commercially successful but also generates notable efficiency gains at the firm level (Costa et al., 2021).

The legal classification of platform work contracts — particularly in ride-hailing and food delivery — has become central to the evolution of labor law. In recent years, platforms and regulators around the world have engaged in dynamic interaction, with varying outcomes. *California's Assembly Bill 5* and the *EU's Platform Work Directive* have introduced rebuttable presumptions of employment based on criteria of control over work, supervision and quality control, restrictions on the ability to accept or reject automatically assigned orders, and the setting of reward levels. China's *Guiding Opinions on Safeguarding the Labour Rights and Interests of Workers in New Employment Forms* introduced the novel category of a "less-than-complete employment relationship." In Russia, drivers are still considered independent subcontractors, and the contracts between them and online taxi platforms are commercial in nature. In most countries, the introduction of new regulations on platform work is a controversial process. Gig platforms "contentiously comply," often attempting to avoid or at least delay assuming the responsibilities of an employer (Valdez, 2022; Muldoon and Sun, 2024).

What guidance does governance structure theory offer on the legal classification of platform-driver contracts? Classic literature on governance structures doesn't provide a definitive answer.

However, Masten (1988) criteria for identifying the firm as a distinct organizational form are compatible with interpreting the ride-hailing platform as a firm. A defining feature of the firm is that it exercises control "not solely on the outcome of a task assigned but also on the matter in which work is performed" (Masten,

1988, p. 186). Ride-hailing platforms likewise exert significant control over drivers' behavior and task execution through algorithmic control, digital surveillance, and strict behavioral rules, thereby influencing not only what work is done but also how it's done. Platforms gain an information advantage over drivers — by collecting performance data, tracking user interactions, and monitoring behavior in real time. Such information asymmetry is also a hallmark of the employer–employee relationship, where the employee has a duty to disclose information and act in the employer's best interest, while the independent contractor has no such duty. This is also consistent with the notion of the firm as an entity that centralizes information to improve internal coordination. Rephrasing Masten (1988), the rules of ride-hailing platforms aim to make the driver as much as possible an extension of the platform itself. Contract termination is easy for both the driver and the ride-hailing platform, and the latter frequently uses termination (both temporary and permanent) as a sanction. In addition, according to the platform's rules, the burden of evidence in any conflict (with the passenger, the platform, or third parties) generally falls entirely on the driver. From this perspective, the boundaries of the ride-hailing platform include drivers as employees.

On the other hand, long before gig platforms came to dominate the sector, there was evidence of combining detailed performance obligations with easy contract termination between parties as a way to avoid the high costs of pricing heterogeneous transactions (see Lafontaine and Masten, 2002; Masten, 2004, on U.S. truck drivers). If we treat a gig platform as simply another contracting party, we may observe similar benefits in applying uniform rules to determine compensation. In this respect, ride-hailing and food-delivery platforms can be viewed as hybrid governance structures that economize on the costs of continual renegotiation, without requiring relationship-specific investments. At the same time, it can be argued that the incentive schemes used by ride-hailing platforms for drivers go well beyond standard contractual performance obligations, particularly because these schemes are subject to frequent unilateral changes.

Classifying governance in online taxi services as a hybrid appears to be a reasonable solution. According to Ménard's typology of hybrids, this structure is characterized by a high centralization of control over pooled resources, combined with decentralized residual rights of control and low decentralization of coordination (Ménard, 2022). In this context, the digital platform should be considered a formal strategic center with the authority to make decisions that are crucial for the network, while drivers retain legal control over their strategic property rights. The agreements between the platform and drivers — typically lacking guaranteed compensation and fixed performance formulas — correspond to Ménard's explanation of the comparative advantage of hybrid forms:

> "…key motivation to go hybrid is to facilitate ex-post adaptation, which relies on contracts that are incomplete, providing only a framework, a blueprint to the relationship" (Ménard, 2022, p. 301).

In this context, control over drivers serves to protect investments in specific assets — particularly the platform information system for collecting and analyzing data and recommendations generation. These assets are specific to the network of interconnected drivers.

However, the interpretation of governance implemented by ride-hailing platforms as a hybrid type of governance also faces two important counterarguments. First, hybrids typically emerge from voluntary agreements between parties that possess some degree of bargaining power. In the case of ride-hailing, individual drivers generally lack meaningful bargaining power, undermining the notion of mutual consent. Second, the governance structures of ride-hailing platforms don't align with Williamson's classic definition of hybrids — as organizational forms that differ from markets by sacrificing incentive intensity in favor of superior coordination, and from hierarchies by forgoing cooperativeness in exchange for stronger incentives (Williamson, 1991). Ride-hailing platforms appear to sacrifice neither. Instead, IT-enabled monitoring equips platforms with highly effective tools for controlling behavior, deterring shirking, misconduct, and other forms of non-compliance with platform service standards. Their performance-based incentive systems, grounded in digital surveillance, simultaneously ensure high-powered incentives and tight coordination. Lastly, if governance structures of ride-hailing platforms were to be classified as hybrids, this would imply that public legal intervention in driver–platform contracts is unnecessary, as hybrid forms are predicated on private ordering by definition. Such a conclusion, however, may be normatively and practically problematic, given the structural power imbalances inherent in platform-mediated work.

As of now, there is no universally accepted classification of ride-hailing platform's governance using the Williamson's 'firm–market–hybrid' framework. Future cross-country comparisons of legal classifications and their practical outcomes will provide essential insight into the transaction costs and efficiencies of different regulatory approaches.

Regardless of which model of platform work regulation ultimately proves most appropriate, future legislative changes will need to account for shifts in the transaction costs of monitoring and control brought about by technological advancements. A further challenge is that much of the emerging legislation continues to target market structures that have effectively ceased to exist. Considerable efforts have been made to foster market entry and competition among independent actors in sectors adjacent to dominant platforms. Yet, if the governance of something as seemingly straightforward as an online taxi service raises substantial conceptual difficulties, these challenges are only magnified in the context of the larger and more intricate digital ecosystems that have recently come under increased scrutiny from competition authorities.

6. Competition policies for digital ecosystems: Revisiting old problems in new contexts

Competition policy toward digital platforms and ecosystems has been the subject of intense debate over the past decade. Recently, this discourse has evolved beyond individual high-profile antitrust cases against the largest digital platforms in the U.S. and Europe to include ambitious legislative initiatives. The European Union's Digital Markets Act (DMA, 2022) has served as a blueprint for similar proposals elsewhere, such as Brazil's Digital Market Law Bill (PL 2768/2022). In the U.S., several sector-specific legislative efforts — including the American Innovation and Choice Online Act, the Open App Markets Act, and the Ending

Platform Monopolies Act — aim to curb the capacity of dominant digital platforms to monopolize adjacent markets.

The theory of harm in competition posed by digital platforms — such as the restriction of third-party applications, contractual single-homing,[1] exclusionary tying,[2] barriers to entry, anti-steering provisions,[3] and, more broadly, self-preferencing (Lancieri and Sakowski, 2021; Motta, 2023) — bears striking resemblance to the challenges encountered during pro-competitive reforms in sectors like electricity, gas, and rail some fifty years ago. In traditional network industries, vertical restructuring was driven by the failure to ensure market access for new entrants, leading to a shift from reliance on competition enforcement to the adoption of regulatory solutions. Large incumbent firms, by virtue of their control over essential or bottleneck facilities, were able to stifle competition. The concept of "gatekeepers", as defined in the EU Digital Markets Act, reflects a recent parallel to these incumbents. The complex and detailed sector-specific regulatory regimes developed to curtail anti-competitive conduct in traditional network industries — particularly telecommunications, electricity, and gas — closely mirror the types of conduct currently attributed to dominant digital platforms. A central concern of regulators in traditional sectors was the use of long-term contracts between incumbents and customers, often involving de facto exclusive arrangements such as "take-or-pay" clauses (Polo and Scarpa, 2013). These are comparable to contemporary restrictions on interoperability and multi-homing that digital platforms impose today, which can similarly entrench market power and inhibit entry.

The goals of sector-specific competition policy in digital markets closely resemble those pursued during the liberalization of network industries four to five decades ago. The immediate target is to protect business users of digital platforms and promote competition in adjacent markets. The longer-term goal is to make entry into the core market more feasible for digital platforms, thereby increasing its contestability. This parallel between past liberalization efforts and current digital market reforms — especially with regard to changes in governance structures — warrants a deeper examination of the historical lessons from infrastructure sectors. In this context, TCE is relevant not only for informing the general design of competition policy but also for evaluating the remedies proposed by antitrust interventions.

A central issue in ongoing debates is the standard of enforcement and the definition of the policy's immediate objectives. Among the proposals to move beyond the traditional consumer welfare standard, several are closely aligned with the logic of TCE and concerns about governance. Notably, Biggar and Heimler (2021) argue that the risk of contractual hazards, particularly the threat of hold-up, is a key source of competitive harm that large digital platforms can

[1] "Contractual single-homing" clauses restrict business users from engaging with rival platforms. Unlike voluntary single-homing driven by network effects, these are binding restrictions aimed at excluding competitors (see Belleflamme and Peitz, 2019).

[2] "Exclusionary tie-ups" involve bundling, where access to one product is conditioned on purchasing another, often to foreclose competition in the tied market (see Hovenkamp, 2024).

[3] "Anti-steering provisions" is a contractual obligation that does not allow the intermediary to persuade (directly or indirectly) customers to purchase a cheaper alternative instead of the recommended product. It can be potentially anticompetitive if used by a dominant seller (see Sato, 2022; Vezzoso, 2024).

inflict. In their view, competition policy should explicitly aim to protect upstream and downstream trading partners from such risks:

> "…we suggest that protecting trading partners from the threat of hold-up is a primary objective of competition law. In addition, we suggest that where the threat of hold-up is persistent and on-going, protecting trading partners from the threat of hold-up is a primary objective of broader competition policy controls, such as regulatory controls on the behaviour and terms and conditions of a dominant firm" (Biggar and Heimler, 2021, p. 1239).

In many respects, this approach stands in tension with the traditional antitrust principle of "protecting competition, not competitors." However, it aligns more closely with sector-specific competition regulation historically applied in industries such as electricity, gas, and rail. Much like in those network sectors, the focus of competition policy in digital platforms is increasingly on ensuring competition among business users on the platform — including between the platform's own integrated services and independent upstream or downstream actors. Inter-platform competition remains desirable — since the incentive to engage in hold-up grows with quasi-rents and diminishes with increased horizontal competition — but it is often less available than efforts aimed at protecting business users from platform-imposed hold-ups.

To prevent such hold-ups, Biggar and Heimler (2021) advocate for proactive regulatory oversight, particularly around discriminatory practices targeting upstream or downstream business users including self-preferencing. Beyond outright prohibitions, regulatory authorities could impose line-of-business restrictions (e.g., banning the platform from replicating the products or services of its business users) or even enforce structural separation. These tools are directly reminiscent of measures historically used in the regulation of electricity and gas markets.

An important and thought-provoking question is whether this regulatory strategy would be consistent with Williamson's governance structures theory. At least in part, the answer appears to be no. Williamson emphasized that regulation is rarely a first-best solution, especially given its slowness and potential for unintended consequences. TCE recognizes that many private-ordering mechanisms already exist to guard against hold-up risks — such as vertical integration, bilateral governance structures, or detailed contracts.

Thus, before identifying hold-up as a systemic justification for either general competition enforcement or sector-specific regulation (such as the EU Digital Markets Act or Brazil's PL 2768/2022), several foundational questions must be addressed. Most crucially: how have large-scale and systemic hold-ups become viable? Both theory and empirical evidence suggest that the threat of hold-up generally disincentivizes investment in highly specific assets unless effective safeguards are in place. These safeguards typically take the form of vertical integration or complex contractual arrangements within hybrid governance structures. In this context, large-scale or systemic hold-ups should be self-limiting — potential victims are expected to anticipate such risks and respond accordingly.

Consider the business-steering strategy of an online marketplace that engages in self-preferencing of its private-label products by leveraging data on the performance of third-party products. If the marketplace is the sole or dominant

promotion channel, then a producer's investment in developing a new product may indeed be asset-specific, exposing it to hold-up. This is precisely the type of risk targeted by regulatory regimes that restrict or prohibit dual-mode business models (where a platform both hosts and competes with third parties).

However, producers are not necessarily passive. As Hagiu and Wright (2021) show, they can strategically respond to the threat of self-preferencing either by diversifying their sales channels or adapting to platform rules. The effectiveness of these strategies depends on whether the platform is an unavoidable trading partner. Is this really the case, and if so, why? In general, the answer is no — unless the marketplace imposes exclusionary contractual terms that limit multihoming. The online marketplace model is replicable, and in most countries, there is meaningful competition among different platforms. When exclusionary clauses do arise, they are often prohibited under existing competition law, particularly for dominant firms. For instance, antitrust investigations in both the EU and the U.S. have focused on Amazon's use of price-parity clauses (or MFN clauses)[4] and tying its fulfillment service to access to Amazon Prime (Scott Morton, 2023). These practices have been central to Amazon's market power and its ability to steer business.

Crucially, the prohibition of price parity clause and tying arrangements significantly reduces the platform's capacity to engage in harmful business steering. In this sense, conventional antitrust enforcement is already well equipped to limit the risk of hold-ups stemming from platform dominance.

The threat of hold-up may emerge as a significant source of inefficiency in one specific context: namely, structural separation, which is currently under discussion in the context of antitrust investigations into Google's digital advertising practices in both the United States and the European Union.[5] A key lesson from the liberalization of network industries is that structural separation, as a standalone policy intervention, doesn't automatically lead to increased competition or efficiency. Rather, its success critically depends on the development of appropriate governance structures. Considering, firstly, the wide cross-country variation in effective governance structures in sectors like electricity, gas, and rail, and secondly, the limited understanding of transaction costs involved in relationships between core digital platforms and adjacent businesses, it is doubtful that a one-size-fits-all policy recommendation is feasible for digital markets.

Nonetheless, limited knowledge can be gradually mitigated through what Williamson described as "economizing decisions" — that is, context-specific, adaptive strategies undertaken by both governments (regulators) and market participants. Take, for example, the enforcement approach under the EU Digital Markets Act (DMA). While it has faced criticism for a mismatch between its ambitious goals — such as promoting interoperability, opening closed digital ecosystems, enforcing data access rights, and preventing self-preferencing — and the limited enforcement tools deployed so far, this approach does have a notable

[4] "Price parity clauses" or "Most favored nation" (MFN) clauses require sellers to maintain equal or lower prices on the platform compared to other channels. While often framed as preventing free-riding, such clauses may restrict upstream price competition when enforced by dominant intermediaries (see Ezrachi, 2015).

[5] On September 5, 2025, the European Commission fined Google €2.95 billion for breaching EU antitrust rules by distorting competition in the advertising technology industry ("adtech"). https://ec.europa.eu/commission/presscorner/detail/en/ip_25_1992

strength. The combination of self-compliance by platform gatekeepers and continuous feedback from market participants and their organizations facilitates the gradual accumulation of empirical knowledge about the nature of transactions and the transaction costs inherent in this sector. This evolving understanding is crucial for crafting more effective and tailored governance and competition policies in digital markets.

7. Upcoming challenges in the age of AI and expanding digital infrastructures

The rapid advancement of artificial intelligence (AI) and other transformative digital technologies — such as blockchain, cloud computing, and the Internet of Things (IoT) — poses novel challenges for TCE and the governance structure theory developed within it. These technologies reshape the fundamental conditions under which transactions occur, altering the traditional dimensions of bounded rationality, information asymmetry, asset specificity, and uncertainty that are central to TCE.

AI-driven recommender systems exemplify these challenges by influencing market coordination and user behavior through algorithmic curation and dynamic personalization. From a TCE perspective, recommender systems function as components of new governance mechanisms that complement historically used tools of contracting and control. However, their complexity and lack of transparency increase transaction costs related to monitoring, verification, and the risk of hold-up, especially for upstream suppliers and independent service providers dependent on platform visibility. The adaptive nature of AI algorithms further complicates governance as contract terms and enforcement mechanisms struggle to keep pace with rapid, data-driven changes.

Together, digital technologies are shifting the governance landscape in affected industries from traditional firm-market-hybrids towards complex, algorithmically mediated ecosystems. This shift challenges the adequacy of existing governance structures, necessitating new institutional frameworks capable of ensuring transparency, accountability, and contestability in increasingly algorithmic decision environments. Regulators and market participants must develop novel tools for algorithmic oversight, data governance, and interoperability standards to mitigate emerging transaction costs associated with asymmetric information and opportunistic behavior embedded within these technologies.

In conclusion, the integration of AI and advanced digital technologies requires extending the governance structure theory to incorporate algorithmic intermediaries, decentralized protocols, and real-time data ecosystems. Understanding these new governance modes is critical for designing policies that balance efficiency gains with safeguards against systemic risks, ensuring robust and adaptive transaction governance in the digital economy.

8. Discussion and concluding remarks: Lessons learned, missed, and still emerging

TCE, along with the governance structures theory developed within it, offers a vital framework for predicting the outcomes of reforms aimed at improving

the efficient allocation of resources through entry promotion. These reforms notably include market liberalization, privatization, and structural remedies in competition policy. Whether or not policymakers explicitly account for transaction costs, the adoption of concepts grounded in governance principles often plays a decisive role in the success or failure of such reforms. However, having this knowledge alone doesn't guarantee success. Even when governments or experts take transaction costs into account, they don't always translate this awareness into viable policy proposals. But when transaction costs are ignored altogether, failure becomes not only more probable, but often more severe. Two contrasting historical cases illustrate this point.

The privatization of assets in Russia and other FSU countries exemplifies the risks of neglecting both existing governance structures and target governance structures, alongside their associated transaction costs. No viable governance options were available for the newly created firms with arbitrarily defined vertical structures. Weak transaction governance eliminated their potential competitive advantages and exacerbated existing disadvantages. In this case, the key lesson learned was that the governance structure itself is a critical determinant of competitiveness.

Liberalization and pro-competitive reforms in traditional network industries illustrate cases where the initial neglect of governance structures and transaction costs was progressively replaced by more deliberate and informed attention over time. There is a clear convergence between the predictions of TCE, governance structure theory, and competition policy in network industries. Targeted changes in governance structures — including regulatory interventions — were necessary conditions for at least partial success of vertical unbundling under deregulation. Lessons about governance after vertical separation have been learned over the decades and are still being learned today.

The rapid growth of the digital economy and the expansion of digital platforms present challenges similar to those encountered in the past — particularly regarding the facilitation of market entry for new participants. These challenges echo those posed by vertical integration in traditional network industries, as well as the collapse of administrative governance structures in post-socialist states several decades ago. Contemporary regulation and competition policy must avoid repeating the historical mistakes of underestimating the critical role of governance, institutional frameworks, and their interactions.

The development of digital platforms based on recommendation systems (including AI as a distinct form) raises at least two key issues: the discrepancy between the economic nature and the legal form of contracts that accompany this new organizational form, and the unpredictability of unbundling policies toward digital platforms — especially given the complex and challenging history of deregulation in network industries.

In analyzing digital platforms, it is crucial not only to emphasize network effects but also to recognize platforms as strategic centers that organize and manage these effects — an insight emphasized in Menard's (2022) framework on organizational governance. The strategic center functions as the coordinating core of the platform ecosystem, shaping incentives, managing information flows, and enforcing rules that collectively reduce transaction costs for participants. This ability to internalize coordination and mitigate frictions within a dispersed

network is a fundamental source of the platform's competitive advantage. Furthermore, when evaluating whether a platform aligns with "firm" or "non-firm" organizational forms, greater attention should be paid to the economic substance of its governance mechanisms rather than to formal legal definitions. This perspective highlights that platform governance — characterized by algorithmic control, incentive alignment, and continuous monitoring — transcends traditional governance categories and calls for an expanded conceptual framework beyond Williamson's original typology.

In other words, digital platforms and ecosystems do not fully conform to Williamson's traditional governance structures as they are commonly understood. While classical categories such as markets, hierarchies, and hybrids provide valuable fundamental insights, digital platforms uniquely combine powerful incentive mechanisms, advanced digital monitoring and control, and algorithmic coordination. These capabilities enable platforms to manage massive flows of legally independent service providers in ways that transcend conventional governance structures. This complexity suggests the need to explore and potentially define new types of governance structures tailored to platform-based ecosystems. However, we emphasize that the formal introduction of such new governance categories should be based only on the results of a variety of rigorous empirical studies.

The rise of AI, blockchain, cloud computing, and IoT is transforming the way transactions are structured and governed. Based on these technologies, new mechanisms — such as recommender systems, smart contracts, and algorithmic decision-making systems — are introducing new forms of intermediation and control. While these innovations can reduce some traditional transaction costs, they also generate new types of complexity, opacity, and strategic dependency. These developments challenge the boundaries of existing governance frameworks, pushing market actors and regulators alike to adapt.

To this end, advancing a more positive and nuanced analysis of transactions in the digital sector is essential. Particular focus should be placed on understanding how new regulatory rules influence governance structures through the process of economizing by market participants. This approach promises deeper insight into the evolving dynamics of digital markets and more effective policy design moving forward. Recognizing the shifting nature of transaction costs and institutional arrangements in technologically mediated environments will be key to ensuring that digital transformation supports, rather than undermines, competition and innovation.

In light of this analysis, we propose a systematization of institutional reform experiences across three broad categories: partially learned lessons, missed lessons, and upcoming lessons. Each category highlights how governance structures, transaction costs, and institutional design interact in different historical and sectoral contexts (Table 4).

A structured comparison of these three types of lessons not only enriches our historical understanding but also offers a forward-looking framework for policymakers and regulators. It reminds us that successful reform is not merely about imposing formal rules but about embedding them in governance structures capable of economizing on transaction costs and adapting to institutional complexity. Crucially, as Williamson's TCE teaches us, the alignment between governance structures and the specific characteristics of transactions determines

Table 4
Institutional reform lessons: Partially learned, missed, and upcoming.

Types of reforms or changes	Lesson type	Key insights on governance and transaction costs	Relevance for future policy design
Liberalization in traditional network industries (electricity, gas, rail and others)	Partially learned	The experience of liberalization showed that vertical separation alone does not ensure competition and market efficiency. Governance structures and transaction costs — particularly those linked to asset specificity and control over essential facilities — were initially underestimated. This led to coordination failures, underinvestment, and delayed competition. Over time, sector-specific governance was gradually introduced to mitigate these problems	The reform experience highlights the need for adaptive, context-specific governance to manage access to bottleneck facilities. It shows that structural separation must be supported by complementary rules and enforcement tools to prevent new entry barriers and hold-up risks. These lessons are directly relevant for platform regulation, where issues like interoperability, data access, and neutrality require similarly robust governance frameworks
Privatization in Russia and other FSU countries	Missed	Lack of attention to governance structures and transaction costs led to inefficiencies and institutional degradation	The reforms experience serves as a cautionary tale of reform failure due to weak institutional foundations
The rise of the digital economy (digital platforms and technologies including AI)	Upcoming	Regulatory concerns (e.g., self-preferencing, platform duality, data access, algorithmic opacity) highlight both parallels with past governance failures and the novel complexity of digital platforms and ecosystems	Indicates the need for innovation in institutional design and adaptive, possibly new governance models tailored to digital platforms and ecosystems

Source: Compiled by the authors.

the effectiveness of reforms — highlighting that one-size-fits-all solutions are unlikely to succeed. This perspective is particularly relevant as we move toward regulating increasingly dynamic and opaque digital ecosystems.

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