

RESEARCH ARTICLE

# Understanding Masahiko Aoki's comparative institutional analysis

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## Abstract

This paper examines the core features of Masahiko Aoki's comparative institutional analysis (CIA), focusing on its methodology and institutional conceptualization. Aoki's CIA integrates institutional and policy theory with comparative and historical analysis to explain institutional diversity and co-evolution. Departing from market-centric models, it emphasizes interdependencies among corporations, government, and society, as well as the roles of public representations and shared beliefs. Drawing on Aoki's English and Japanese works, the paper situates CIA within his intellectual history and offers a preliminary comparison with the institutional theories of Ronald Coase, Douglass North, and Oliver Williamson. It also outlines five areas for future research, including the landscape of institutional economics, firm and corporate institutions, tech monopolies, Japan's institutional transition and dynamic capabilities, and the co-evolution of human nature and institutions. Nearly a decade after Aoki's passing, the paper argues that CIA remains essential for advancing institutional economics in today's complex global landscape.

**Keywords:** comparative institutional analysis (CIA); institutional co-evolution; institutional diversity; institutional economics; institutional process

## Introduction

The aim of this paper is to explore the defining features of Masahiko Aoki's comparative institutional analysis (CIA) by examining its methodological foundations and conceptualization of institutions within his intellectual history. Aoki (1938–2015) dedicated his career to advancing CIA, a framework that transcended disciplinary boundaries by integrating insights from economics, law, sociology, and beyond. His goal was to break disciplinary silos and achieve a systemic understanding of institutions through a *transboundary* methodology that redefined institutional analysis.

Aoki described CIA as an 'economics of pluralism' (Aoki, 2000: 1), aimed at identifying conditions for *institutional diversity* gains through a universal analytical language – game theory, mechanism design, and contract theory. He emphasized three key points: (1) The 'Walrasian model of the market economy' (Aoki, 1995: 48) is unrealistic due to bounded rationality, asymmetric information, and market incompleteness. (2) Institutional analysis must move beyond Anglo-American systems and account for real-world institutional diversity. (3) A comparative and historical approach is essential to understanding interdependencies among institutions beyond market structures (Aoki, 2000: xi; Aoki *et al.*, 1997).

This paper investigates Aoki's CIA, which embodies these core messages, and asks: How does it exhibit originality compared to other approaches within the broader field of institutional studies? These include institutional economics (e.g., Hodgson, 1998, 2004; Langlois, 1986; Rutherford, 1994), which

consists of new institutional economics (NIE) centered on the *three giants* – Ronald Coase, Douglass North, and Oliver Williamson (Ménard and Shirley, 2014), and original institutional economics represented by Thorstein Veblen, John Commons, and others. To address this question, the paper highlights the distinct characteristics of CIA from two perspectives: methodology and institutional conceptualization. It also attempts a *preliminary* comparison by engaging in a narrative review of the relationship between Aoki's approach and the institutional economics of the three giants.

Unlike them, Aoki's CIA was not confined to Anglo-American economic systems. Instead, he conducted *empirical comparative and historical analyses* across diverse countries and regions, expanded firm theory (e.g., Aoki, 1984) into a broader theory of corporations (e.g., Aoki, 2010a), and examined *institutional co-evolution* (e.g., Aoki, 2001, 2010a, 2013a, 2014a). While grounded in mathematical formalism, his work extended beyond *general institutional theory* to propose *policy theory* for institutional reform. His 'three-level approach to institutions' (Aoki, 2010a: 124) challenged the intellectual foundations of the three giants.

The novelty of this paper lies in two aspects. First, it incorporates both Aoki's English and Japanese works, offering insights beyond *Toward a Comparative Institutional Analysis* (Aoki, 2001; *TCIA*). According to Aoki's CV and his selected papers (Aoki, 2013a), his English works started from his 1970 study on increasing returns (Aoki, 1970). In 2017, his posthumous analysis of comparative institutional change in Tokugawa Japan and Qin Dynasty China (Aoki, 2017) was published. His books range from *The Co-operative Game Theory of the Firm* (Aoki, 1984) to the selected papers (Aoki, 2013a). Additionally, this paper examines his Japanese works such as his first Japanese monograph, *Soshiki to Keikaku no Keizai Riron (The Economic Theory of Organization and Planning)* (Aoki, 1971; *ETOP*), and *Aoki Masahiko no Keizaigaku Nyumon (An Introduction to Masahiko Aoki's Economics)* (Aoki, 2014a), revealing aspects of his broader intellectual system – what may be termed *Aoki Theory* (Itoh, 2015a). In this paper, I attempt to present a tentative synthesis (e.g., Okazaki, 2015) and criticisms of Aoki's CIA.

At the same time, prior studies on Aoki's CIA have re-examined his general institutional theory (e.g., Aoki, 2001, 2007, 2011a, 2015), particularly following his death in 2015, producing excellent research (e.g., Herrmann-Pillath, 2017; Takizawa, 2017). Like these previous studies, this paper does not aim to comprehensively discuss all of Aoki's research contributions. However, unlike them, it considers both English and Japanese literature and incorporates an overview of his intellectual history and methodology. Furthermore, it focuses on the characteristics of his CIA, which he developed around firms, corporations, and organizations (e.g., Aoki, 2010a, 2011b; Itoh, 2015a, 2015b).

Second, this paper explores Aoki's perspective on the nature of institutions and institutional change. In particular, institutional change is classified into three approaches (Coccia, 2018, 2019): (1) *Design-Based Theories*, where change results from political rule-making; (2) *Evolutionary Theories*, where spontaneous adaptation drives institutional emergence; and (3) *Equilibrium Theories*, where changes in expectations and beliefs shape institutions. Aoki's CIA aligns with the equilibrium theory of institutional change (e.g., Kingston and Caballero, 2009). This paper clarifies his views on both the equilibrium and evolutionary nature of institutions (e.g., Aoki, 2001, 2007, 2010a, 2010b, 2014a, 2014b, 2017).

This paper is structured as follows. Section 2 provides an overview of Aoki's intellectual history leading to CIA and its methodology. Section 3 explores the conceptualization of institutions within CIA. Section 4 offers a review of Aoki Theory and attempts a preliminary comparison with the institutional economics of the three giants. The conclusion presents future research agendas in CIA.

## Methodology of CIA

At the outset, this section provides an overview of Aoki's intellectual history leading to CIA. Aoki's research was driven by a desire to design ideal mechanisms that foster 'human interactions that are truly human,' characterized by participatory decision-making and cooperative behavior within communities (Aoki, 1971: v). This aspiration shaped the foundation of CIA.

Aoki conceptualized economic systems as institutional complexes and advocated using game theory to model diverse economic systems as *multiple equilibria*, thereby implying institutional diversity. However, he emphasized that comparative and historical analysis is essential to explain why a particular equilibrium is selected and sustained. CIA's defining feature is its *interactive approach*, integrating game-theoretic micro-modeling with real-world comparative and historical data (Intensive Lecture by Professor Masahiko Aoki, June 24, 1996, Graduate School of Business and Commerce, Keio University).

Aoki's intellectual journey began at the University of Tokyo, where he co-founded the *Bund* (Communist League) in 1958, leading anti-authoritarian student movements against the U.S.-Japan Security Treaty and the policies of Prime Minister Nobusuke Kishi (e.g., Aoki, 2018; Otake, 2007; Shiozawa, 2017). During this time, he was deeply influenced by Kozo Uno's economic theory, which emphasized historical research grounded in general theory, stage theory, and conjunctural analysis (Uno, 1964/2016: 23; Aoki, 2014a).

A pivotal moment in Aoki's intellectual trajectory occurred when he encountered the paper Arrow and Hurwicz (1960). This paper ultimately prompted him to transcend Marxism, move through mathematical economics, and cross into CIA. Aoki described the authors of this paper – Kenneth Arrow, a 1972 Nobel laureate known for his contributions to general equilibrium theory, and Leonid Hurwicz, a 2007 Nobel laureate recognized for his work on mechanism design – as his 'intellectual heroes' who profoundly shaped his life (Aoki, 2014a: 49).

Aoki's first book as an economist, *ETOP*, critiqued neoclassical economics for idealizing Anglo-American markets. By the 1980s, Aoki had made significant contributions to developing a realistic theory of the firm, focusing on stakeholder interactions (e.g., Aoki, 1978, 1984), and comparative analysis of U.S. and Japanese economic systems (e.g., Aoki, 1988, 1990). Aoki also deepened his observations of the U.S. and became particularly interested in the Silicon Valley phenomenon (e.g., Aoki, 2001; Aoki and Takizawa, 2002). One of the most notable aspects of this institutional phenomenon was the emergence and concentration of small-scale startups driven by entrepreneurship.

In 2001, Aoki published his monumental work on CIA, *TCIA*. Later, in 2008, he was invited to deliver the Clarendon Lecture in Management Studies at Oxford University, which led to the publication of *Corporations in Evolving Diversity* (Aoki, 2010a; *CED*). In the Japanese edition (Aoki, 2011b: v), Aoki stated that he wrote this book with a strong desire to consolidate his research findings on 'organizations, firms, and corporations'.

Following the 2011 Fukushima nuclear disaster, Aoki analyzed the institutional failures behind it, comparing it with past nuclear accidents like Three Mile Island (1979) and Chernobyl (1986) (Aoki and Rothwell, 2013). In his 2013 IEA presidential lecture, he explored nuclear issues in the broader context of East Asian institutional development (Aoki, 2013b).

Tragically, on July 15, 2015, Aoki passed away at the age of 77. Even in his final days, despite facing significant mobility challenges, Aoki continued his comparative historical research on Japan's Meiji Restoration and China's Xinhai Revolution from his sickbed (Che, 2015). His unfinished manuscript (e.g., Aoki *et al.*, 2016) awaits posthumous publication.

Aoki's intellectual trajectory is reflected in CIA's methodology, which rests on three pillars: (1) *domains* as units of analysis, (2) *synchronic and diachronic comparison* of institutions, and (3) the *three-level approach to institutions*.

A domain consists of a set of players and a set of all technologically feasible actions for each player (A: sets of feasible actions). In addition to these two elements, a third element – the consequence function (CO), which defines rules that assign a single outcome to each combination of actions taken by different players – constitutes the game structure, thereby defining the exogenous rules of the game.

In this framework, actors treat CO and A as exogenously given data within the domain. They then engage in strategic choice (S) – choosing actions – based on expectations (E) about other players' strategies. Aoki identified four key elements – A and S as internal to the actor (micro), and CO and E as external (macro) – and named the fundamental structure of the game the COASE box (Aoki, 2001: 186–188).

Aoki further classified six fundamental types of domains: (1) commons domain, where players use common-pool resources that are accessible to everyone; (2) economic (or transaction) domain, where players are endowed with private property and engage in financial, labor, and product transactions; (3) organization domain, where players cooperate under a centralized authority to jointly produce goods and distribute the output among themselves through the exchange of authority and contributions; (4) organizational field domain, where multiple organizations emerge after player matching; (5) polity domain, where government and private actors interact in exchanging political power and support; and (6) social exchange domain, where non-economic goods, language, and gifts are exchanged (e.g., Aoki, 2001, 2002).

Aoki did not assume that all domains could be endogenized simultaneously. He was skeptical of starting an analysis from a world without institutions or eliminating exogenously given rules. Instead, he viewed equilibria generated by actors' strategic choices within a given domain as being shaped by the institutional environment – defined by the endogenous rules of surrounding domains (Aoki, 2001: 15).

Aoki's CIA constructs simple thought-experiment frameworks, formulating games played across various domains in their most primitive forms. It then examines proto-institutions, which represent the foundational aspects of institutions that emerge as equilibria, such as organizational architectures (OA) or the state (*ibid.*: 33). No matter how primitive an institution may be, assuming the existence of some form of institution and actors is crucial – an assumption indispensable for institutional analysis (Hodgson, 2007).

Even though players in different domains are boundedly rational with limited cognitive capabilities, they form beliefs about the strategic choices of others and select rational actions from their available action sets to maximize their own payoffs (Aoki, 2001: 187). Through the aggregation of these individual strategic choices, equilibria emerge, which in turn summarize as institutions within and across multiple domains (*ibid.*: ch. 1 and 7).

Since the institutions that emerge within a given domain depend on the institutional arrangements of other domains, institutional diversity exists across entire economic, polity, social exchange, and organization domains, extending beyond national economies (Aoki, 2002). CIA goes beyond a unidirectional causal relationship between domains; rather, it seeks to clarify the interactions across interdependent domains (Aoki, 2010b). Thus, it does not assume the primacy of one domain over another – such as the idea that an institution in one domain (e.g., the social exchange) directly gives rise to an institution in another domain (e.g., the organizational field).

To explore the interdependencies between domains as well as the unique characteristics of each domain, Aoki adopted a transdisciplinary approach, integrating research from economics, cognitive science, evolutionary psychology, political science, and beyond. His transdisciplinary approach aimed to break down the disciplinary silos of conventional social sciences, fostering cross-disciplinary insights while relying on game-theoretic reasoning to develop an integrated social science (Aoki, 2002).

CIA employs synchronic comparison to understand institutional diversity as multiple equilibria by comparing institutions across different regions and countries. Meanwhile, diachronic comparison examines institutions at different points in time within a given country or region to analyze the process of institutional evolution, shaped by path dependence yet also open to new possibilities (Aoki, 2001).

CIA is particularly historically grounded, as it attempts diachronic comparisons of the institutional evolution processes of various nations and organizations. While Aoki emphasized the indispensable role of game theory in CIA, he also recognized that equilibrium selection cannot be fully understood through game theory alone (*ibid.*: 4–5). Therefore, he acknowledged the necessity of incorporating comparative and historical information, even at the risk of being criticized for relying on 'ex post explanations' (Aoki, 2014a: 102).

Given this, the common criticism that CIA recognizes the existence of multiple equilibria but remains silent on which equilibrium emerges within a particular system (e.g., Furubotn and Richter, 2008) does not necessarily apply. According to Aoki, institutional analysis, which must incorporate game theory, also needs to be comparative and historical to adequately address the problem of

equilibrium selection (Aoki, 2001: 3). In other words, the importance of institutions implies the importance of history as well (Aoki, 2014a: 64).

Aoki sought to understand how equilibrium selection – the emergence of a particular institution among multiple possibilities – occurs through interactions across domains. To this end, he introduced two key concepts that capture the linkages between games: (1) *synchronic linkages* (Aoki, 2001: ch. 8) and (2) *diachronic linkages* (ibid.: ch. 10). Synchronic linkages pertain to the equilibrium nature of institutions and their diversity, explaining how institutions become self-sustaining and cluster into a coherent whole. In contrast, diachronic linkages relate to the evolutionary nature of institutions and their evolving diversity, illustrating how institutions change and how their diversity persists over time.

One representative type of synchronic linkage is social embeddedness. This concept suggests that the social exchange domain can embed other domains, thereby sustaining strategic choices that would otherwise be difficult to maintain. For instance, Aoki examined the evolution of social norms in Japanese rural communities during the Tokugawa period (17th to 19th century). He demonstrated the effectiveness of linking the social exchange domain (which governs the accumulation or depletion of social capital) with the commons domain (which manages resources that are difficult to exclude access to) (ibid.: ch. 2). The effectiveness of such linked games is not unique to Tokugawa-era rural communities. As Ostrom (1994) demonstrated using data from 76 irrigation systems in Nepal, irrigation system development that fails to adequately account for local social capital can reduce productivity. It should be noted that, in addition to a general understanding of social embeddedness, analyzing the context-specific mechanisms of social embeddedness in individual cases is also crucial.

Another representative type of synchronic linkage is institutional complementarity. This concept refers to the mutual reinforcement of various institutions within a system – such as corporate or economic systems – resulting in system effects (e.g., Aoki, 1994a; Williamson, 1991). Institutional complementarity can be formally expressed using the supermodularity concept in lattice theory (e.g., Aoki, 2001; Milgrom and Roberts, 1994; Topkis, 1998).

Aoki argued that in situations characterized by strategic complementarity, where it is advantageous for boundedly rational actors to adopt strategies dominant in society, their strategic choices are influenced by institutions in other domains, which they perceive as exogenous parameters (Aoki, 2000, 2001). The existence of institutional complementarity suggests that a system forms an internally coherent whole, making it difficult to change or design individual institutions in isolation (e.g., Aoki, 2001; Aoki, 2014a). When institutional complementarity exists across different domains, inefficient institutional arrangements may persist (Aoki, 2001: 228, Proposition 8.1).

Next, let us examine diachronic linkages. One example is overlapping social embeddedness, which dynamizes the concept of social embeddedness. This leads to path dependence in the long-term process of institutional evolution (ibid.: 246). Another example is diachronic institutional complementarity, which focuses on dynamic interactions between complementary domains. The Momentum Theorem states that the interdependence between upstream and downstream activities – based on the evolution of capabilities over time in industries – is essential for sustaining economic growth with momentum (Milgrom *et al.*, 1991). Expanding on this theorem, Aoki suggested that institutional changes in one domain can trigger a cascading effect, causing institutional changes in other domains as well (Aoki, 2001: 268–269, Proposition 10.1).

In summary, regarding synchronic and diachronic linkages, CIA posits that: (1) The diverse systems of complementary institutions observed in the real world can be understood as multiple equilibria, implying institutional diversity. (2) The evolution of these systems depends on their initial conditions, leading to distinct historical trajectories and implying path dependence. (3) Each system represents a local optimum rather than a global one, implying local optimality (e.g., Aoki, 1996; Okuno-Fujiwara and Takizawa, 1996).

Aoki's CIA adopts a three-level approach to institutions, which was influenced by Uno Economics (Aoki, 2014a). This approach consists of the following three levels (e.g., Aoki, 2010a: 124, 2014a: 190):

**Ontological Level (Essential Theory):** This level examines the basic existential conditions of equilibrium rules in societal games, clarifying the role of history, the relationship between individual choices and social cognitive categories, and the interaction between actions and cognition in institutional evolution. At this level, the nature of institutions is the primary focus, aiming to develop a general theory for gaining an essential understanding of institutions.

**Comparative-Historical Level (Substantial Theory):** This level conducts synchronic and diachronic comparisons of the interrelationships between different domains' rules across countries and over time. It focuses on the substantive representations of institutions, such as states, laws, and organizations, as well as their linkages, complementarity, and path dependence. Through empirical comparative (or synchronically comparative) and historical (or diachronically comparative) analysis, this level develops a substantial theory of institutions for an analytical understanding of institutional forms.

**Policy Level (Policy Theory):** This level proposes the design and reform of formal rules to mediate institutional changes so that societal games are played in ways acceptable to society. Based on empirical comparative and historical analysis, it explores ideal policymaking for institutional reforms through public discourse.

In sum, Aoki's three-level approach to institutions is transboundary, implying that it is based on a transdisciplinary approach, cutting across nations, regions, and disciplines, and an interactive approach, frequently moving back and forth between theory and reality through fieldwork by engaging in synchronic and diachronic comparison to collect comparative and historical information for theorizing the nature of institutions.

Aoki made significant contributions to the development of substantial theory at the comparative-historical level through various CIA models that extended beyond the Anglo-American context: (1) the J-model, which represents a system-oriented model of Japanese firms (e.g., Aoki, 1988, 1990; Aoki and Dore, 1994); (2) the relational contingent governance model, which focuses on corporate governance (CG) in Japan, East Asia, and transition economies (e.g., Aoki, 2001, 2010a; Aoki and Patrick, 1994; Aoki and Kim, 1995); (3) the SV-model, which analyzes entrepreneurship and innovation systems in Silicon Valley (e.g., Aoki, 2001; Aoki and Takizawa, 2002); (4) the corporation model, which addresses the worldwide diversity of corporations based on the essentiality of cognitive assets (e.g., Aoki, 2010a; Aoki and Jackson, 2008); (5) CIA of nuclear disasters, which examines global nuclear disasters in light of the Fukushima nuclear disaster (Aoki and Rothwell, 2013); and (6) comparative institutional transition, which analyzes the modernization of nation-states in East Asia (e.g., Aoki, 2013b, 2017, Aoki *et al.*, 2016).

In practice, CIA follows a *circular process* (Aoki, 2014a: 215), progressing through a structured research cycle: (1) Observing emergent institutional phenomena in the real world; (2) modelling systematically stylized facts with multiple defining characteristics; (3) focusing on multiple domains by defining endogenous domains (*explicanda*) and exogenous domains (*explanans*); (4) identifying multiple equilibria in simplified thought-experiment frameworks and selecting those effective for understanding the nature of institutions; (5) analyzing interdependencies among institutions through comparative and historical information; (6) evaluating comparative advantages and disadvantages of different institutional arrangements; (7) deriving policy implications based on empirical comparative and historical analysis; and (8) refining theories through feedback, leading to a deeper essential understanding of institutions such as firms and corporations (e.g., Aoki, 2001, 2010a, 2014a).

## How CIA conceptualizes institutions

### *Institutions as shared beliefs and public representations emerge in the institutional process*

At the ontological level, Aoki's CIA conceives of institutions as emergent phenomena shaped by the co-evolution of cognition (micro) and constraints (macro), as illustrated by the COASE box in *TCIA*

(Aoki, 2001: ch. 7). Curiously, however, he does not use the COASE box at all in *CED*. Instead, drawing on a different terminology from *TCIA* and relying on a circular process, he conceptualizes institutions as stable linkages between common knowledge and beliefs through public representations (Aoki, 2010a: 69–70).

Aoki conceptualized societal games as recursive interactions within a population, where institutions emerge through a circular process or the *institutional process* (Aoki, 2017: 173): (1) individual actors form behavioral beliefs (BB) about others' strategic choices; (2) based on these beliefs, they select strategies (S) to maximize payoffs; (3) these choices aggregate into an equilibrium state of play (ESP) within a given domain; and (4) through summarization and verification, public representations of common knowledge (PRCK) emerge, in a continuing cycle ( $\Rightarrow$ ). This recursive, institutional process – 'BB  $\rightarrow$  S  $\rightarrow$  ESP  $\rightarrow$  PRCK  $\Rightarrow$ ' – illustrates the dynamic interplay between individual cognition and institutional structures (Aoki, 2010a).

The institutional process highlights the *micro-macro links*, in which micro-level beliefs held by individual actors shape macro-level institutions within a given domain, which in turn influence cognition and action over time. PRCK – such as laws, norms, and organizations – mediate between societal ESP and actors' BB (Aoki, 2011a, 2017; Takizawa, 2017). Aoki criticized rule-based theories for overlooking the connection between ESP and PRCK and equilibrium theories for neglecting their relationship to BB. CIA introduced an equilibrium theory of endogenous rules to bridge these gaps (Aoki, 2015).

Over time, institutional processes shape heuristics, reinforcing the co-evolution of cognition and institutions. This perspective aligns with studies on cognitive institutions (e.g., Frolov, 2023, 2024; Greif and Mokyr, 2017; Petracca and Gallagher, 2020), which Aoki referred to as subjective game models (Aoki, 2001) or cognitive frames (Aoki, 2010a).

Aoki applied David Lewis's theory of common knowledge (Lewis, 1969) to CIA. In this view, institutions function as public representations that encapsulate common knowledge about states of play. Players rely on common knowledge to form coordinated beliefs about how societal games are played. These shared beliefs perpetuate the recurrence of distinctive features in evolving states of play (Aoki, 2010a: 70). If a game's state is common knowledge, then: (1) All players know the state of play. (2) All players know that all players know the state of play. (3) This chain continues infinitely (e.g., Aoki, 2010a; Aumann, 1976; Greif, 2006; Lewis, 1969; Ostrom, 1990).

Public representations serve as endogenous rules, aligning diverse actors' beliefs and facilitating the emergence of shared beliefs. Thus, in CIA, institutions comprise both shared beliefs and public representations (Aoki, 2017).

### *Institutions exhibit a dual duality*

CIA recognizes institutions as exhibiting a *dual duality* (e.g., Taniguchi, 2025a): (1) a functional duality between *constraint* and *enabler* and (2) an epistemic duality between *subjectivity* and *objectivity*. First, institutions simultaneously constrain and enable action (Aoki, 2010a: 71). Boundedly rational actors rely on institutions – laws, norms, and organizations – as *extended cognitive assets*. By adhering to institutional constraints, they reduce cognitive load, allowing greater focus on other tasks (ibid.: ch. 4). For instance, drivers follow established traffic rules without deliberation, conserving cognitive resources. Since deviating imposes costs, institutions exhibit self-enforcing properties.

Second, institutions display an epistemic duality. They exist both subjectively, internalized as shared beliefs, and objectively, as external public representations (Aoki, 2007: 9). Thus, when analyzing the nature of institutions, one must consider both subjective aspects (e.g., expectations, habits) and objective aspects (e.g., structures, public representations) (e.g., Hodgson, 2006).

Institutions, even when codified, only function if actors perceive them as legitimate and taken for granted. Institutional enforceability depends on actors' belief in legitimacy. If government bureaucrats or sports referees have incentives to privately distort institutional rules, then the enforceability of institutions depends on actors' beliefs about institutional legitimacy and

taken-for-grantedness (Aoki, 2002). Even when formal rules exist, they do not constitute institutions unless actors internalize them as shared beliefs.

Shared beliefs function as if-then rules (*If X, then Y*) or normative imperatives (*Z must/must not be done*), coordinating actors' expectations and helping them discover equilibria (Aoki, 2001: ch. 7). Institutions operate as normative rules (*In situation X, do Y*), where compliance stems not only from sanctions but also from moral legitimacy and social approval (Hodgson, 2006). They generate obligations encoded in rights, duties, and permissions – features unique to humans (Searle, 2005). However, Searle (2015) criticizes equilibrium theories, arguing that equilibrium alone cannot create obligations, which must precede rational choice (Searle, 2005).

In reality, institutional normativity develops through repeated play. Institutions constrain behavior while facilitating goal realization. Normativity emerges from practical morality, including market reputation, peer respect, and social capital preservation (Aoki, 2010a). For institutions to acquire normativity, actors must internalize legitimate mental models, engage in morally reinforced actions, and form stable habits. Habit formation stabilizes cognitive and behavioral patterns through learning (Hodgson, 1997). Thus, understanding institutional normativity requires examining the historical interplay between moral practice and institutional evolution (Hodgson, 2006).

### *Institutions change through public discourse, quasi-environments, cognitive programs, and cultural beliefs*

Aoki's 'cognitive-media view of institutional evolution' (Aoki, 2011a: 31) emphasizes how institutions reduce cognitive load, allowing actors to rely on intuitive judgments rather than deliberate, utility-maximizing rational reasoning (Aoki, 2010a: 98). This cognitive economy frees up capabilities, which may then be redirected to other domains (Aoki, 2010a).

At this point, marked as '⇒' in the institutional process ( $BB \rightarrow S \rightarrow ESP \rightarrow PRCK \Rightarrow$ ), actors face two choices: (1) experiment with new strategies, driving institutional change or (2) continue existing strategies, reinforcing institutional persistence. At the micro-level, self-enforcing properties deter unilateral deviation, while at the macro-level, institutional change must overcome four key characteristics (Aoki, 2001: 233–235): (1) Institutions persist as shared mindsets, requiring threshold shifts for change. (2) Feedback mechanisms link institutions and actors' evolving capabilities. (3) Political power is allocated to those benefiting from the status quo. (4) Institutional interdependencies resist fragmented modifications.

Aoki (2001, 2010a, 2011a, 2014a) identifies four key drivers of institutional change. First, *public discourse* serves as a forum for linguistic interaction where multiple actors challenge the existing system. Over time, dominant discourse becomes formalized as new public representations (laws, organizations, and values) (Aoki, 2014a: 203–205).

Second, *quasi-environments* arise from bidirectional domain interactions (Aoki, 2010a, 2011a). Aoki (2008) conceptualizes the game form, or the exogenous rules of the game, as consisting of a pair of domain and consequence functions. Actors' strategic choices within a given domain are influenced by the institutional environment of that domain. When the game is played repeatedly, the parameters of the game form, including actors' mental states, capabilities, and technologies, may gradually evolve. These changes can be considered partially endogenous (ibid.: 125). While the institutional environment appears exogenous to individual actors, it is, in fact, an endogenous product of a domain. Within this environment, quasi-parameters exhibit quasi-endogeneity – appearing exogenous in the short term but becoming endogenous over the long term (Greif, 2006; Greif and Laitin, 2004). The interplay between economic, political, and social domains drives institutional change, as shifts in parameters can erode shared beliefs and trigger transitions (Aoki, 2014a: 84–85).

Third, symmetric *cognitive programs* enable actors to form beliefs about the state of play by referencing public discourse. They behave as 'symmetric reasoners' (Aoki, 2010a: 127), assuming that others engaged in the same discourse will reason similarly. This pattern recognition plays a growing role in institutional evolution (Correspondence with Masahiko Aoki, December 3, 2010).

Fourth, *cultural beliefs*, which shape institutional stability, function as inherited cognitive priors influencing public discourse and cognitive programs (Aoki, 2010a, 2011a, 2014a). Culture can be taken as the inherited values and beliefs from the past (e.g., Guiso *et al.*, 2009; Denzau and North, 1994). Rather, Greif (1994) views cultural beliefs as expectations about how others will act in various contingencies. Aoki extends this to argue that historically repeated interactions create common priors, forming mutual knowledge that anchors institutional processes against instability (Aoki, 2014a: 206–208).

In sum, according to Aoki's cognitive-media view, institutional change is shaped by public discourse, quasi-environments, cognitive programs, and cultural beliefs. Given that public representations allow room for actors' interpretative flexibility, incremental adjustments drive gradual institutional change (Jackson, 2005). Consequently, institutional transitions unfold over extended periods.

## The originality of CIA

### *The five components of Aoki theory*

Here, I would like to tentatively present a synthesis of Aoki's intellectual system (e.g., Okazaki, 2015), namely *Aoki Theory* (e.g., Itoh, 2015a). Aoki identified four key elements of his system (Aoki, 2013a: xi): (1) Comparative Mechanism Design; (2) Game-Theoretic Approach to the Diversity of CG; (3) Analysis of the Endogenous Nature of Institutions; and (4) Institutions in East Asian Economic Development.

Itoh (2015a) emphasized Aoki's comparative study of horizontal and vertical firm information structures (Aoki, 1986), while Shiozawa (2017) further highlighted Aoki's critique of neoclassical economics for neglecting firm complexity. Thus, firm organization and anti-neoclassical perspectives became central to CIA. To further refine Aoki Theory, we must emphasize his focus on firm organization and his critique of neoclassical economics, as highlighted by Itoh and Shiozawa.

Thus, it is preferable to synthesize Aoki Theory into five fundamental components: (1) *Comparative Mechanism Design*, focusing on selecting and comparing organizational mechanisms; (2) *Radical Political Economy*, challenging the limitations of neoclassical economics; (3) *Comprehensive Firm Theory*, integrating firm incentives, information structures, and corporations as associative cognitive systems interacting with stakeholders; (4) *Empirical Comparative and Historical Analysis*, examining institutional diversity across various contexts – including China, Japan, the U.S., transition economies, East Asia, and so on – by analyzing institutional configurations in CG, government roles, nuclear policy, and economic development to derive policy recommendations; and (5) *General Institutional Theory*, aiming for an essential understanding of institutional emergence, persistence, resilience, transition, and change based on an equilibrium view of endogenous rules, focusing on actors such as individuals, firms, and governments.

### *Aoki and the three giants: a preliminary comparison in institutional economics*

This discussion provides a preliminary comparison between Aoki's CIA and the institutional economics of Coase, North, and Williamson – three giants of NIE. However, this is only an initial inquiry. A comprehensive evaluation of Aoki Theory would require an in-depth examination of all five components of his intellectual framework and a thorough methodological and theoretical positioning within institutional economics. Nevertheless, as a foundational step, it is valuable to explore how CIA aligns with major trends in institutional economics, particularly in relation to the contributions and limitations of the three giants, who popularized NIE through core concepts such as contracts, property rights, and transaction costs (Ménard and Shirley, 2014).

Coase and Williamson, however, have limitations in their understanding of corporate entities and legal personhood, while North's analysis of political markets is similarly constrained (Hodgson, 2014). Among the three, Coase appears to have held particular significance for Aoki. Coase, awarded the

Nobel Prize in 1991 for his research on the institutional structure of the economy, made pioneering contributions to firm theory (Coase, 1937) and the development of law and economics (Coase, 1960). His influence is evident in Aoki's engagement with the Coase problem concerning the *raison d'être* of firms (Aoki, 1984) and the COASE box representing micro-macro links (Aoki, 2001).

Aoki and Coase shared three key orientations: (1) moving beyond neoclassical firm theory; (2) examining the interdependence of law and economics; and (3) emphasizing fieldwork in understanding real-world economic systems. Both scholars moved beyond the neoclassical view of the firm, which does not fully capture its organizational nature. Aoki, in developing CIA, assumed the existence of institutions and actors, focusing on the equilibrium characteristics generated within specific domains. Unlike Coase (1937), who posed the ontological question of why firms – 'islands of conscious power' (ibid.: 388) – exist within the market, Aoki took institutional existence as a given and analyzed their diversity and viability through game theory (Aoki, 2010a: 120–121). Furthermore, he distinguished between the authority relations that facilitate coordination within firms and the distribution of quasi-rents generated through cooperation, viewing firms as arenas where negotiations over quasi-rent distribution occur (Aoki, 1984: ch. 2). This contrasts with Coase's emphasis on transaction costs in explaining the existence of firms.

Coase (1960) also argued that legal rules inherently determine the internalization of social costs, critiquing Arthur Pigou's (1952) advocacy of government intervention in resolving externality problems. He emphasized the role of transaction costs in shaping institutional arrangements and highlighted the interconnections between law, economics, and political institutions (Coase, 1978: 206–207).

Aoki, however, viewed some aspects of law and economics, particularly the design-oriented approach, with skepticism. He proposed an evolutionary interpretation of law, treating it as an independent institutional domain (Aoki, 2014a: 206). He introduced the legal domain as a seventh institutional domain alongside six others (Aoki, 2017: 173). While he acknowledged the interdependence between law and economics, he is critical of the notion of law's primacy (e.g., Posner, 1990). His perspective aligns with Simon Deakin, who conceptualized law as a cognitive order evolving over time, co-evolving with economic systems to create institutional complementarities (Deakin, 2011; Deakin and Carvalho, 2011).

Aoki also recognized the importance of fieldwork early in his career at Kyoto University in 1969. His interest in firms as information systems led him to conduct factory visits, where he learned interview-based research methods (Aoki, 2018: ch. 22). Fieldwork was highly valued not only by Aoki himself but also by Alfred Marshall, whom he referenced in his early published paper (e.g., Aoki, 1970), and by Coase, who deeply respected Marshall as an economist devoted entirely to his discipline (e.g., Medema, 1994; Reid, 2015; Taniguchi, 2025b). In particular, Coase, frustrated with economists who neglected empirical observation, deeply valued fieldwork to understand economic systems (e.g., Shirley *et al.*, 2015).

Aoki had direct personal interactions with Williamson and North, viewing them as rigorous discussion partners. His engagement with Williamson focused on two aspects: (1) systemic thinking for understanding Japanese firms and (2) behavioral assumptions about human nature. Williamson, awarded the 2009 Nobel Prize for his research on governance, co-edited a seminal work with Aoki that redefined the firm, shifting from the nexus of contracts model to a nexus of treaties (Aoki, Gustafsson, and Williamson, 1989). Unlike a contract, a treaty highlights the need for private ordering from the outset, as it often operates beyond the reach of centralized legal authority (ibid.).

Aoki, like Coase and Williamson, appears to have rejected a simplistic notion of legal centralism. However, unlike North and Williamson, he did not support the view that domains such as polity and social exchange determine the rules governing the economic domain. Instead, he emphasized the co-evolution of institutions across multiple domains (Aoki, 2008).

Aoki's 1988 study comparing Japanese and U.S. firms introduced a systemic perspective, highlighting elements such as internal organization, CG, and bureaucracy. He further modeled Japanese firms using his duality principle, implying a combination of centralization and

decentralization in organization, and institutional complementarity perspective (Aoki, 1990, 1994a, 1994b). Williamson built upon Aoki's research, focusing on employment, keiretsu, and finance, arguing that their interactions created system effects, implying the mutually reinforcing effects that arise when the three elements operate not in isolation, but rather as a system (Williamson, 1991).

On behavioral assumptions, Aoki's CIA shared Williamson's early views on opportunism and bounded rationality but diverged in emphasis. While Williamson (1975) argued that firms primarily exist to mitigate opportunism, Aoki contended that firms are structured to enable cooperation, with institutions controlling opportunistic tendencies while fostering collective benefits (Aoki, 2010a: 23).

In his comparison with North, Aoki addressed three key issues: (1) engagement in policy research, (2) the relationship between economy and polity, and (3) research communication. North encouraged Aoki to take on a policy-oriented role at RIETI (Research Institute of Economy, Trade and Industry), framing it as fieldwork in institutional research (Aoki, 2014a: 32). It serves as a policy think tank located in Kasumigaseki, the symbolic center of Japan's bureaucracy. This makes it an ideal place for observing the policymaking process in the real world. Aoki and North debated the latter's political determinism, which suggests the supremacy of the polity domain over the economic domain, while drawing on his experience at RIETI, Aoki shifted toward institutional co-evolution theory, recognizing the mutual influences between the two domains (Aoki, 2018: 100). They also participated in key academic conferences, discussing the complementarity of markets and governments (Aoki, 1998; North, 1998) and the role of transaction costs in institutional evolution (North, 2001).

Through CIA, Aoki sought to address two limitations Hodgson (2014) identified in NIE: (1) the lack of an understanding of corporate entities and legal personhood and (2) an insufficient conceptualization of political markets. Unlike the America-centric approaches of Coase and Williamson, Aoki adopted a global perspective that encompassed the U.S., Japan, and other countries, developing a more nuanced theory of corporations. His fieldwork at RIETI further distinguished his institutional co-evolution approach to the complementarity of economy and politics from North's politically deterministic framework.

Furthermore, unlike Aoki – an advocate of the equilibrium view of endogenous rules of the game and domain-level co-evolution – both North's exogenous rules-of-the-game perspective (North, 1990) and Williamson's governance structure view (Williamson, 2000) equate institutions with the prior specification of consequence functions and action constraints, while also imposing a hierarchical ordering of domains. As a result, they face two key challenges (Aoki, 2008: 115): (1) how institutions are enforced and (2) who formulates formal institutions.

Ménard and Shirley (2014: 543) argued that Aoki, despite being a major institutional economist, maintained a certain distance from NIE. I suspect this is due to his distinctive methodology, which is referred to as the three-level approach to institutions. Aoki, mainly trained by Arrow and Hurwicz, utilized elegant mathematical formalism, incorporating game theory and mechanism design. At the same time, he transcended disciplinary boundaries, integrating insights from cognitive science and evolutionary psychology to pursue the construction of a *general theory of institutions*. Additionally, he engaged in synchronic and diachronic comparisons of institutions – namely, *empirical comparative and historical analyses* – to understand economic systems in their evolving diversity beyond the Anglo-American economic system. This approach enabled him to actively participate in *policy debates*, translating his findings into practical institutional reforms. Such transboundary methodology represents a distinct originality not found in the three giants of NIE and may explain why Aoki remained somewhat detached from the core of the new institutionalist tradition.

Despite Aoki's contributions, two criticisms of CIA remain: (1) Its complexity creates high barriers to entry. (2) It lacks empirical comparative and historical analysis on corporate and industrial evolution. First, CIA established high barriers to entry, primarily due to its complexity. Aoki himself acknowledged this, stating that: 'My books are, overall, highly intense, and I believe readers will need a considerable level of concentration to engage with them.' (Correspondence with Masahiko Aoki, December 26, 2010). Scholars such as Dow (2003) and Greif (2015) argued that while Aoki's reliance on elegant mathematical formalism was intellectually rigorous, it made his work difficult to access.

Additionally, Aoki's continuously evolving conceptual framework made CIA a *moving target*, restricting engagement within the field of institutional economics.

In particular, *TCIA* fails to address a key issue: distinguishing between a plausible narrative and a superior hypothesis. Its scattered presentation of historical data and gradual introduction of key assumptions further obscure its content (Seabright, 2003).

Second, Aoki's ideal-type modeling of corporations risks stereotyping (Gospel, 2010: 772). Though he recognized the need for diachronic comparative analysis, he did not extensively engage in business historical research. In contrast, Williamson acknowledged Alfred Chandler's influence in understanding corporate evolution (Williamson, 1991). Given that Chandlerian firms have evolved toward market-oriented strategies like global value chains (GVC), modularization, and outsourcing (Langlois, 2007), integrating business history into CIA could enhance its explanatory power. By incorporating business history, CIA could develop a more comprehensive, multilevel understanding of institutional co-evolution across actors, firms, industries, and nations, including capability evolution (e.g., Chandler, 1992; Fruin, 1992; Taniguchi, 2022; Taniguchi and Fruin, 2024; Taniguchi *et al.*, 2025).

## Conclusion

This paper has traced Aoki's intellectual history leading to CIA, which integrates game theory with synchronic and diachronic comparison to analyze institutional diversity and co-evolution. It has primarily focused on Aoki's methodology and institutional theory, leaving broader aspects of his intellectual system for future research. Given this limitation, I conclude by identifying five key areas for further exploration: the first two involve theoretical investigations, while the last three pertain to understanding institutional phenomena.

First, CIA must be situated within the broader landscape of institutional economics. Future research should go beyond the three giants to examine other perspectives (e.g., Hart, 2017; Hodgson, 1998, 2006, 2007; Nelson, 2007; Ostrom, 1990, 2005; Smith, 2003). Notably, Greif (2006) developed comparative and historical institutional analysis (CHIA) as an alternative to CIA. Cole (2013) systematically categorized institutional approaches, while Roggero *et al.* (2018) examined institutional analysis in the context of climate change. Future studies should refine theoretical distinctions within institutional economics, particularly between Aoki's CIA and Greif's CHIA.

Second, a re-examination of Aoki's conceptualization of firms and corporations is needed. Firms operate within societal games spanning multiple domains, shaping and adhering to institutional rules (Aoki, 2010a: 12–13). His corporation theory represents a transdisciplinary attempt to explain institutional co-evolution (Deakin, 2010). The distinction between corporations as legal entities and firms as economic entities is often overstated (e.g., Robé, 2020, 2021). Understanding the co-evolution of law and corporate institutions requires bridging these perspectives (e.g., Deakin, 2017; Deakin *et al.*, 2017, 2021).

Third, the institutional evolution of tech monopolies such as Alphabet, Amazon, Apple, Meta, and Microsoft, which Aoki did not examine in depth during his lifetime, warrants investigation. These firms have leveraged network effects to consolidate economic and political power (e.g., Hagi and Wright, 2015; Langlois, 2019; Pitelis, 2024; Rochet and Tirole, 2003; Taniguchi and Dolan, 2018). The rise of AI-driven capability ecosystems, especially in the U.S. and China, aligns with Aoki's prediction that *RE-type* OA would gain prominence (Aoki, 2010a: ch. 5). Future research should examine how these architectures evolve within tech monopolies and their broader institutional impact.

Fourth, Japan's 'Three Decades of Transition' (Aoki, 2014a: 8) requires deeper analysis. Aoki anticipated a prolonged transition starting with the 1990s financial crisis and argued that institutional transformation takes time (Aoki, 2002: 323). In fact, Japan's institutional change has not progressed smoothly. Teece (2023), citing Aoki's work on Japanese CG (Aoki, 1988; Aoki and Jackson, 2008; Aoki *et al.*, 2007), argued that Japanese firms lack the dynamic capabilities (DC) necessary for institutional innovation. Integrating Aoki's CIA with Teece's DC (e.g., Teece, 2009) could provide a framework for good governance and reform.

Furthermore, fostering *transboundary capabilities* – critical thinking and entrepreneurship – is essential. CIA's policy theory should extend to leadership development in the private sector, an area largely unexplored. While CIA has analyzed power asymmetries between government and private actors (Aoki, 2001, 2010a), future research should examine the DC necessary for institutional transformation beyond government.

Finally, further exploration of human actors in CIA is needed. Aoki conceptualized actors as *homo ludens*, shaping and transforming institutions (Aoki, 2010a). He emphasized their ability to assign functions to objects and represent rules through language (e.g., Aoki, 2014a, 2015; Gintis, 2016; Guala and Hindriks, 2015; Hindriks and Guala, 2015; Searle, 2005). Many aspects remain underexplored, including the justification of mental models and the internalization of norms.

In a rapidly changing world driven by generative AI and quantum computing, do Williamson's assumptions of bounded rationality and opportunism, which Aoki adopted, still hold? This question examines whether the behavioral assumptions from the 1970s remain valid in the 21st century, an era characterized by remarkable digital advancements – one that Aoki and Williamson did not observe in depth. Future research must refine CIA's understanding of the co-evolution of human nature and institutions (e.g., Coase, 1984; Denzau and North, 1994; Frolov, 2023, 2024; McCloskey, 2022; North, 2005; Smith and Wilson, 2019; Taniguchi and Fruin, 2022).

Nearly a decade has passed since Aoki's passing. Today, we are confronted with *grand challenges* – climate change, war, nuclear threats, rapid digitalization, growing political and economic uncertainty, and so on – that endanger both human survival and planetary sustainability. In this context, reassessing Aoki's intellectual legacy – particularly his emphasis on real-world institutional diversity and co-evolution – through the lens of comparative and historical analysis has become an urgent task. Such a reassessment is essential not only for contributing, from a policy perspective, to the search for solutions to these pressing issues, but also for making a theoretical contribution to the further development of institutional economics.

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