Symbiosis, co-evolution, and relational identity: A holobiont theory of organizational boundaries

10.29073/jer.v4i2.71

Received: April 29, 2026.
Accepted: June 15, 2026.
Published: Month XX, 20XX.

Author: Ayşe Yazıcı, Istanbul Gelisim University, Turkey, ayazici@gelisim.edu.tr.

Abstract

Contemporary organizational theory treats boundaries as fixed, jurisdictional, and hierarchically enforced an assumption shared by transaction cost economics, resource dependence theory, and ecosystem frameworks. We argue that this jurisdictional boundary assumption constitutes a fundamental theoretical limitation: it renders boundary permeability theoretically invisible, forecloses a constitutive logic of inter-organizational collaboration, and produces a static conception of organizational identity. To address this gap, we introduce the holobiont a host organism and its symbiotic microbiome functioning as a single co-evolutionary unit as a theoretically generative framework for reconstructing organizational boundaries and collaboration. Drawing on three biological mechanisms constitutive symbiosis, co-evolutionary boundary formation, and emergent identity we develop three formal propositions and identify three boundary conditions under which holobiont logic applies: temporal depth, mutual transformation, and distributed governance. We illustrate the framework's empirical purchase through three paradigmatic cases: the Linux/Apache ecosystem, Toyota's keiretsu supplier network, and biotechnology research consortia. The holobiont framework does not replace existing theories; it identifies the conditions under which they apply and opens new research directions on inter-organizational collaboration, ecosystem governance, and relational organizational identity.

Keywords: Boundary Permeability; Co-Evolutionary Governance; Holobiont Organization Theory; Relational İdentity; Symbiotic Collaboration.

1. Introduction

The boundaries of organizations have long been treated as self-evident: a firm begins where its legal jurisdiction starts and ends where its contractual authority ceases. This conception, deeply embedded in the foundational texts of organizational theory, from Weber's (1947) bureaucratic model to Williamson's (1981) transaction cost economics and Pfeffer and Salancik's (1978) resource dependence framework, has proven remarkably durable. Yet durability is not the same as adequacy. As contemporary organizations increasingly operate through platform ecosystems, inter-organizational alliances, open innovation networks, and hybrid governance arrangements, the question of where one organization ends and another begins has become not merely empirically ambiguous but theoretically unresolved. Existing frameworks offer powerful tools for explaining why boundaries exist and how they are governed, but they share a common epistemological assumption: that boundaries are fixed, jurisdictional, and hierarchically enforced. It is precisely this assumption that this paper calls into question.

We argue that organizational theory's persistent attachment to hierarchical boundary logic reflects a deeper conceptual limitation one that cannot be resolved from within the tradition itself. Transaction cost theory explains boundary placement as a function of efficiency and opportunism (Williamson, 1981). Resource dependence theory explains boundary management as a response to environmental uncertainty (Pfeffer & Salancik, 1978). Ecosystem and platform theories expand the unit of analysis but retain the assumption that organizational identity is anchored in a stable, recognizable core (Jacobides et al., 2018). None of these frameworks theorizes the boundary as a relational, permeable, and co-evolutionary phenomenon as something that is not drawn once and defended, but continuously negotiated through symbiotic interaction. This theoretical gap is not merely academic. It leaves organizational scholars without adequate conceptual tools to explain how

identity, collaboration, and competitive advantage emerge in systems where the line between inside and outside is, by design, never fixed.

To address this gap, we turn to biology specifically to the concept of the holobiont. In evolutionary biology, a holobiont is defined as a host organism together with all of its symbiotic microorganisms, functioning as a single unit of selection and adaptation (Margulis, 1991; Zilber-Rosenberg & Rosenberg, 2008). What makes the holobiont theoretically generative for organizational scholarship is not its biological content per se, but the conceptual architecture it reveals: an entity whose boundary is not anatomical but relational, whose identity is not fixed but emergent, and whose survival depends not on the exclusion of external actors but on the quality of its symbiotic relationships. The holobiont does not ask "who is inside and who is outside?" It asks "with whom am I co-evolving, and how does that relationship constitute what I am?"

The application of biomimetic reasoning to organizational theory has a legitimate and growing scholarly tradition. Morgan's (1986) seminal work demonstrated that biological metaphors are not decorative devices but epistemological instruments they reveal organizational properties that conventional frameworks render invisible. Subsequent contributions have drawn on a range of biological systems: ant colony optimization to theorize distributed coordination (Bonabeau et al., 1999; Couzin, 2009), immune system dynamics to reconceptualize adaptive organizational resilience (Iansiti & Levien, 2004), and ecological succession models to theorize the evolution of industry architectures (Tushman & Anderson, 1986). More recently, scholars have applied biomimetic reasoning to agile leadership structures, adaptive decentralization, and swarm-based coordination in complex organizational environments (Akkaya & Yazıcı, 2020; Yazıcı, 2023; Yazıcı & Öztırak, 2024). Each of these contributions shares a common move: treating biological systems as structural analogues that make visible the mechanisms underlying organizational phenomena. The present paper extends this tradition by targeting the most foundational unit of organizational analysis the boundary and reconstructing it through the holobiont lens. In doing so, we do not propose a metaphor in the loose sense. We propose a theoretically grounded framework that generates novel propositions about organizational boundaries, collaboration logic, and relational identity.

This paper proceeds as follows. We first review the existing organizational boundary literature, identifying the theoretical gap that hierarchical frameworks leave open. We then introduce the holobiont concept from its biological foundations, explicating the mechanisms of symbiosis, co-evolution, and functional integration that constitute holobiont identity and that we subsequently translate into organizational terms. Drawing on these foundations, we develop a holobiont organizational framework centered on three formal propositions: that organizational boundaries are most productively theorized as permeable and relational rather than fixed and jurisdictional; that collaboration logic in holobiont organizations operates through symbiotic co-evolution rather than transactional exchange or hierarchical coordination; and that organizational identity in holobiont systems is emergent and relational rather than stable and self-contained. We conclude by discussing the implications of this framework for organizational theory, identifying productive points of dialogue with transaction cost theory, resource dependence theory, and ecosystem frameworks, and outlining an agenda for future empirical research.

This paper makes three contributions to organizational theory. First, it reconceptualizes organizational boundaries as relational and permeable phenomena, challenging the jurisdictional assumptions embedded in transaction cost and resource dependence frameworks. Second, it introduces the holobiont as a theoretically rigorous biomimetic framework distinct from prior biological metaphors in its capacity to theorize boundary permeability, symbiotic collaboration, and relational identity simultaneously. Third, it generates a set of formal propositions that bridge evolutionary biology and organization theory, opening new directions for empirical research on inter-organizational collaboration, ecosystem governance, and organizational identity.

2.Theoretical Background and Literature Gap

2.1. The Hierarchical Foundations of Organizational Boundary Theory

The concept of organizational boundaries has been theorized primarily through the lens of hierarchy, control, and efficiency. Weber's (1947) foundational model of bureaucracy established the organization as a rationally

ordered system of authority, in which roles, responsibilities, and jurisdictions are clearly delineated. Within this framework, the boundary of the organization is coextensive with its authority structure: the organization extends as far as its legitimate command reaches and no further. This conception, while analytically powerful, encodes a specific assumption about the nature of boundaries that they are fixed, enforceable, and defined by the exclusion of external actors from internal decision-making processes.

Transaction cost economics (TCE) deepened this logic by grounding boundary decisions in efficiency calculations. Williamson (1981) argued that the boundary of the firm is determined by the relative costs of market exchange versus hierarchical coordination: activities are internalized when the transaction costs of market governance opportunism, asset specificity, uncertainty exceed the costs of administrative control. In TCE, the boundary is not merely a jurisdictional line but an economizing device. Yet the fundamental assumption remains intact: the boundary separates inside from outside, and the organization's task is to manage this separation efficiently. The boundary is a solution to the problem of opportunism, not a site of generative relationship.

Resource dependence theory (RDT) shifted attention from efficiency to power, arguing that organizations manage their boundaries in response to environmental uncertainty and resource scarcity (Pfeffer & Salancik, 1978). Boundary-spanning activities mergers, joint ventures, board interlocks, long-term contracts are understood as strategies for reducing dependence on external actors and securing critical resources. RDT introduced a more dynamic view of boundaries, acknowledging that organizations actively work to reshape their relationships with the environment. Nevertheless, the underlying logic remains hierarchical: the organization seeks to absorb, control, or neutralize external dependencies. The boundary is a defensive perimeter, and the goal of boundary management is to extend organizational control outward rather than to dissolve the distinction between inside and outside.

More recent contributions have expanded the unit of analysis beyond the individual firm to encompass ecosystems, platforms, and networks (Jacobides et al., 2018; Adner, 2017). Ecosystem theory acknowledges that value creation increasingly occurs across organizational boundaries, through complementary relationships among multiple actors. Platform theory recognizes that some organizations deliberately open their boundaries to external developers, users, and partners as a source of competitive advantage. These frameworks represent significant advances over TCE and RDT in their capacity to theorize inter-organizational interdependence. Yet they retain a residual hierarchical assumption: even in ecosystems and platforms, there is a recognizable core the keystone firm, the platform owner whose identity, authority, and strategic intent anchor the system. The boundary may be more permeable than in classical theory, but it is still fundamentally a boundary between a defined organizational center and its external environment.

2.2. The Theoretical Gap: Boundary Permeability as a Generative Property

Taken together, these frameworks share what we term the *jurisdictional boundary assumption*: the view that organizational boundaries are, at their core, demarcations of authority, ownership, and control. This assumption has three interrelated consequences for organizational theory. First, it renders boundary permeability theoretically invisible or at best, theoretically marginal. Permeability is treated as a problem to be managed (RDT), a cost to be minimized (TCE), or a strategic choice made by a bounded core actor (ecosystem theory). It is never theorized as a constitutive property of organizational identity as something that makes the organization what it is rather than threatening what it is.

Second, the jurisdictional boundary assumption forecloses a particular kind of collaboration logic. Within hierarchical frameworks, inter-organizational collaboration is fundamentally transactional or relational in the dyadic sense: two bounded actors exchange resources, share risks, or pool capabilities while remaining fundamentally separate entities. The possibility that collaboration might be constitutive that organizations might become what they are through their symbiotic relationships rather than despite them is theoretically unthinkable within the jurisdictional framework. This is not a minor gap. It means that organizational theory currently lacks

the conceptual vocabulary to describe what happens when the boundary between collaborating organizations becomes not just permeable but generative.

Third, the jurisdictional boundary assumption produces a static conception of organizational identity. In classical and neoclassical frameworks, the organization has a stable identity a defined set of resources, capabilities, and strategic intentions that precedes and grounds its boundary decisions. Identity is the anchor; the boundary is the expression of that identity in space. This conception struggles to account for organizations whose identity is itself relational and emergent whose "what we are" is inseparable from "with whom we are co-evolving." Platform firms, open innovation ecosystems, and inter-organizational communities of practice all exhibit this property to varying degrees, yet organizational theory has no framework that places relational identity at the center of its analysis.

Santos and Eisenhardt (2005) came closest to addressing this gap in their influential typology of organizational boundaries, distinguishing among efficiency, power, competence, and identity conceptions of the boundary. Their identity conception in which boundaries define "who we are" rather than merely "what we control" opens theoretical space for a more relational account. Yet even Santos and Eisenhardt ultimately anchor identity in a stable organizational core, treating boundary decisions as expressions of a pre-given organizational self rather than as processes through which the self is continuously constituted. The gap remains: organizational theory needs a framework in which identity, boundary, and collaboration are not three separate phenomena to be related but three dimensions of a single relational process.

2.3. Biological Metaphors in Organizational Theory: Promise and Limitation

Organizational theorists have long recognized the generative potential of biological reasoning. Morgan's (1986) canonical work identified the organism metaphor as one of the most productive lenses through which organizational phenomena can be understood, revealing properties adaptation, metabolism, lifecycle, interdependence that mechanical metaphors render invisible. Subsequent work has drawn productively on a wide range of biological systems: ant colony dynamics to theorize collective intelligence and emergent coordination without central command (Bonabeau et al., 1999; Couzin, 2009), ecological succession and keystone species models to theorize industry evolution and platform dominance (Iansiti & Levien, 2004; Tushman & Anderson, 1986), and immune system architecture to reconceptualize adaptive organizational responses to environmental threats (Anderson, 1999). More recently, scholars have extended biomimetic reasoning to agile and adaptive leadership structures, decentralized organizational decision-making, and swarm-based autonomous coordination in complex systems (Akkaya & Yazıcı, 2020; Yazıcı & Öztırak, 2024).

Each of these contributions demonstrates the epistemological productivity of biomimetic reasoning in organizational theory: biological systems make visible organizational mechanisms that conventional frameworks, anchored in assumptions of rationality, hierarchy, and bounded agency, cannot easily see. Nevertheless, existing biomimetic frameworks in organizational theory share a significant limitation: they import biological mechanisms to explain organizational processes coordination, leadership, adaptation while leaving the boundary itself theoretically intact. Ant colonies illuminate how organizations coordinate without central command, but they do not challenge the assumption that the organization has a fixed boundary. Gray wolf dynamics illuminate how leadership can be distributed and contextual, but the pack remains a bounded entity. Even holographic organizational theory, which explicitly theorizes the whole as present in every part, does not fundamentally reconceptualize where the organization ends.

It is here that the holobiont concept offers something genuinely new. Unlike prior biological analogues applied to organizational theory, the holobiont does not merely describe a mechanism within a bounded system. It challenges the boundedness of the system itself. In the holobiont, the question "where does the organism end?" does not have a stable anatomical answer it has only a relational one. The identity of the holobiont is constituted by its symbiotic relationships, and its boundary is a function of those relationships rather than their precondition.

This is precisely the conceptual architecture that organizational theory currently lacks, and it is the foundation on which we build our theoretical framework in the sections that follow.

3. The Holobiont: Biological Foundations and Theoretical Transfer

3.1. Origins and Definition

The holobiont concept has its intellectual roots in the work of Lynn Margulis, whose theory of symbiogenesis fundamentally challenged the neo-Darwinian view of evolution as a process driven exclusively by competition and random mutation (Margulis, 1991). Margulis demonstrated that the eukaryotic cell the basic unit of all complex life is itself a product of symbiotic merger: mitochondria and chloroplasts, once free-living bacteria, were incorporated into host cells through endosymbiosis, eventually becoming indispensable components of a new integrated organism. The implications were profound: what appeared to be a single, bounded biological entity was in fact a co-evolutionary assemblage of formerly distinct organisms. The boundary of the organism, far from being a fixed anatomical fact, was revealed as a historical and relational achievement.

Building on this foundation, Zilber-Rosenberg and Rosenberg (2008) formally proposed the holobiont as the unit of natural selection, arguing that the host organism and its associated microbiome the totality of bacteria, fungi, viruses, and other microorganisms that inhabit it function together as a single evolutionary unit. In their framework, the holobiont is not the host plus its microbiome as two separate entities in a relationship; it is a new kind of entity whose properties emerge from the integration of host and symbionts. Fitness, adaptation, and survival are properties of the holobiont as a whole, not of its components in isolation. Subsequent research in evolutionary biology and microbiology has substantially supported and extended this view, demonstrating that the microbiome is not peripheral to host biology but constitutive of it shaping immune function, metabolic capacity, neurological development, and behavioral repertoires in ways that cannot be attributed to host genetics alone (Gilbert et al., 2012).

3.2. Three Constitutive Mechanisms

For the purposes of theoretical transfer to organizational analysis, we identify three constitutive mechanisms of the holobiont that are analytically distinct and collectively generative: symbiosis, co-evolution, and emergent identity. Each mechanism corresponds to a theoretical gap identified in our review of organizational boundary literature, and each will ground one of the formal propositions we develop in the following section.

Symbiosis as a constitutive relationship. In biological usage, symbiosis refers to a close and persistent interaction between two or more different organisms. Crucially, symbiosis is not a transactional exchange between pre-constituted entities; it is a relationship that transforms the entities involved. The gut microbiome does not merely assist the host in digesting food; it shapes the host's immune system, influences its behavioral responses to stress, and co-regulates its developmental processes (Gilbert et al., 2012). The host, reciprocally, provides the microbiome with a stable environment, nutritional resources, and protection from external competition. Neither party is the same entity it would be in the absence of the relationship. This is what distinguishes symbiosis from transaction: transactions occur between stable entities and leave their identities intact, while symbiosis constitutes the entities through the relationship itself.

Co-evolution as a boundary process. In the holobiont, the boundary between host and symbiont is not fixed at a moment in time and subsequently defended; it is continuously renegotiated through co-evolutionary processes. The composition of the microbiome changes in response to environmental conditions, host behavior, and inter-microbial competition, and the host's biological systems adapt in response to these changes. What counts as "inside" the holobiont which microorganisms are integrated into its functional identity is therefore not a property of the holobiont at any given moment but a process unfolding over evolutionary and developmental time. This has a profound implication: the boundary of the holobiont is not a precondition of its identity but a consequence of its relational history. Boundaries are outcomes of co-evolutionary processes, not inputs to them.

Emergent identity. Perhaps the most theoretically challenging property of the holobiont is that its identity what it is, what it can do, how it responds to environmental challenges is irreducibly emergent. It cannot be predicted

from the properties of the host genome alone, nor from the properties of any individual symbiont. It emerges from the integrated functioning of the holobiont as a whole, including the dynamic interactions among its microbial inhabitants and between those inhabitants and the host. Gilbert et al. (2012) captured this succinctly in their argument that the holobiont challenges the very concept of the individual organism: if identity is emergent and relational, then the individual is not a natural kind but a theoretical convenience a useful but ultimately provisional boundary drawn around a subset of a larger co-evolutionary process.

3.3. The Epistemological Basis of Theoretical Transfer

Before proceeding to develop our organizational framework, we address directly the epistemological question that any biomimetic theoretical contribution must answer: on what basis can mechanisms identified in biological systems be transferred to organizational analysis? This question is not merely procedural; it goes to the heart of what organizational theory is doing when it draws on biology.

We follow Morgan (1986) and Tsoukas (1991) in treating theoretical transfer not as analogy in the decorative sense where biological language is borrowed to make organizational phenomena seem more vivid but as structural homology in the analytical sense: the claim that two different systems share a common underlying structure, such that mechanisms identified in one illuminate mechanisms obscured in the other. The validity of structural homology does not rest on the similarity of surface features but on the isomorphism of relational structures. We do not claim that organizations are holobionts in any literal sense. We claim that the relational structure of the holobiont constitutive symbiosis, co-evolutionary boundary formation, and emergent identity is homologous to relational structures present in certain organizational phenomena that existing theory cannot adequately explain.

This epistemological position is consistent with a growing body of biomimetic organizational research and with the broader tradition of analogical reasoning in social science. Ecological models of industry dynamics (Hannan & Freeman, 1977; Tushman & Anderson, 1986) established that biological mechanisms of variation, selection, and retention illuminate organizational processes that efficiency-based frameworks cannot see. More recent applications have demonstrated structural homology between immune system architecture and adaptive organizational resilience (Anderson, 1999), between ant colony optimization and distributed decision-making in complex systems (Bonabeau et al., 1999), and between agile leadership structures and predator pack dynamics (Akkaya & Yazıcı, 2020). In each case, the theoretical transfer is justified not by surface resemblance but by the capacity of the biological structure to reveal organizational mechanisms that conventional frameworks render invisible. The criterion for valid structural homology, as Tsoukas (1991) established, is the isomorphism of relational structures across domains not descriptive similarity between surface features. The holobiont framework satisfies this criterion precisely: the relational architecture of constitutive symbiosis, co-evolutionary boundary formation, and emergent identity maps onto organizational phenomena that existing theory cannot adequately explain, not because organizations resemble biological organisms superficially, but because both systems instantiate the same underlying relational logic.

4. The Holobiont Organization: A Theoretical Framework

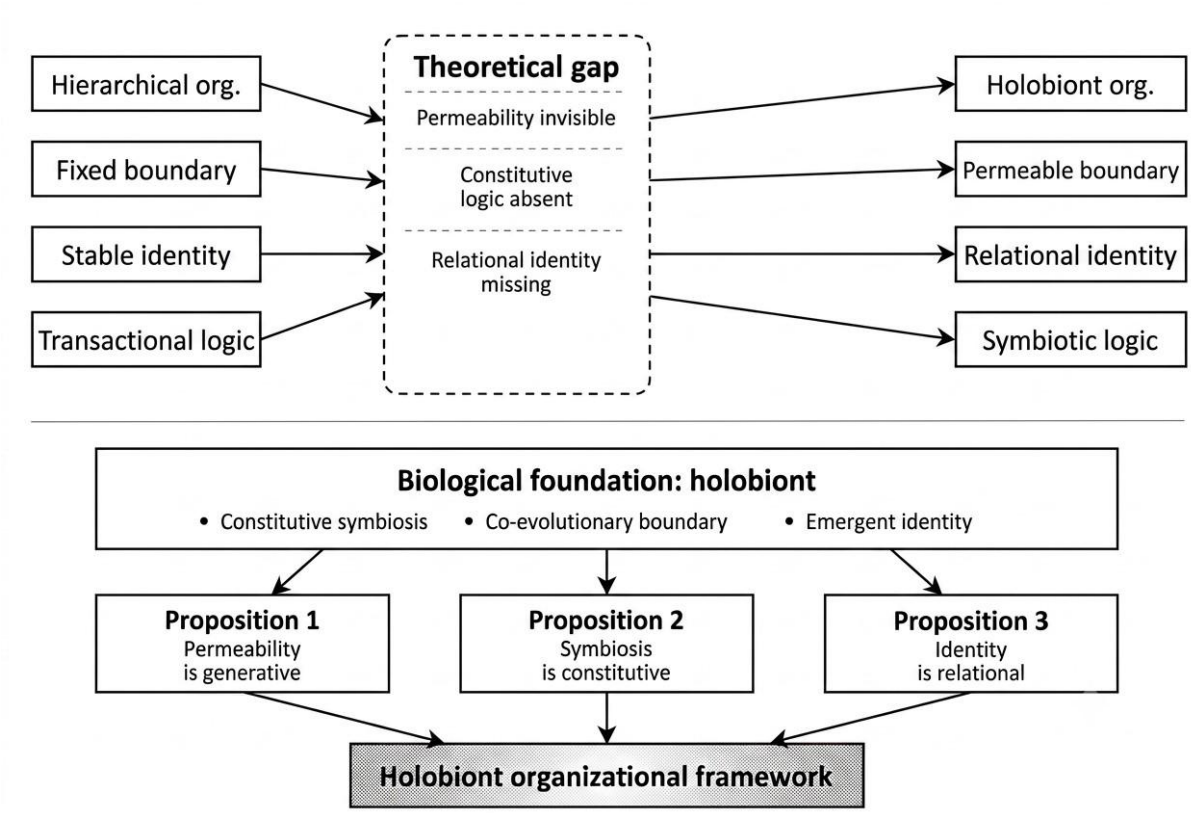
4.1. Conceptual Foundations

The holobiont organizational framework we develop in this section is built on a single foundational claim: that the most theoretically productive unit of organizational analysis is not the bounded firm but the relational assemblage the constellation of actors, relationships, and co-evolutionary processes through which organizational identity, capability, and boundary are simultaneously constituted. This claim does not require us to abandon existing organizational theory; it requires us to relocate its foundational assumptions. Where transaction cost theory asks "how should the boundary be drawn to minimize governance costs?", the holobiont framework asks "how does the boundary emerge from the quality of symbiotic relationships?" Where resource dependence theory asks "how should the organization manage its boundary to reduce environmental uncertainty?", the holobiont framework asks "how does environmental interdependence constitute what the

organization is?" The shift is not from one answer to another but from one question to another and it is in the reframing of the question that the theoretical contribution lies.

We organize the holobiont organizational framework around three analytically distinct but mutually constitutive dimensions: boundary permeability as a generative property, symbiotic collaboration logic, and relational organizational identity. Each dimension is grounded in the biological mechanisms identified in the previous section, translated into organizational terms through the principle of structural homology, and formalized in a theoretical proposition. Together, the three propositions constitute a coherent theoretical framework that addresses the gaps identified in our literature review.

Figure 1: The holobiont organizational framework: from jurisdictional to relational boundaries.



Source: Author's own design.

4.2. Dimension One: Boundary Permeability as a Generative Organizational Property

In classical organizational theory, boundary permeability is a problem. Porous boundaries expose the organization to opportunism (Williamson, 1981), resource dependence (Pfeffer & Salancik, 1978), and identity dilution (Santos & Eisenhardt, 2005). The managerial task is to calibrate permeability opening the boundary enough to access external resources while closing it enough to protect internal capabilities and maintain organizational coherence. Permeability is instrumentally valuable but intrinsically threatening; it is to be managed, not embraced.

The holobiont framework inverts this logic. In biological holobionts, boundary permeability is not a concession to environmental pressure but the mechanism through which the holobiont constitutes itself. The continuous exchange of metabolic products, genetic material, and regulatory signals between host and microbiome is not a compromise of the holobiont's integrity; it is the process through which that integrity is produced and maintained. A holobiont with impermeable boundaries would not be a more coherent organism; it would be a dead one. Permeability, in the holobiont, is generative rather than threatening it is the condition of possibility for the emergence of properties that no component of the holobiont possesses alone.

Translated into organizational terms, this suggests a fundamental reconceptualization of what boundary permeability does for organizations. Rather than treating permeability as a variable to be optimized more or less open depending on environmental conditions and strategic intent the holobiont framework treats permeability as the generative mechanism through which organizational capabilities, identity, and competitive advantage are produced. Organizations that engage in deep, persistent, and constitutive exchange with external actors suppliers, partners, customers, regulators, communities do not merely access external resources; they become different kinds of organizations through that exchange. Their capabilities are not portable assets that exist independently of their relational context; they are emergent properties of the relational assemblage as a whole.

This has direct implications for how we theorize the relationship between boundary permeability and organizational performance. Existing frameworks predict a curvilinear relationship: moderate permeability optimizes the trade-off between access and protection, while excessive permeability undermines organizational coherence and competitive distinctiveness. The holobiont framework predicts a different pattern: the relationship between permeability and organizational capability is not curvilinear but conditional on the quality of symbiotic relationships. High permeability in the context of constitutive symbiosis generates emergent capabilities that bounded organizations cannot replicate; high permeability in the context of transactional exchange generates vulnerability without compensating advantage. The critical variable is not the degree of permeability but its relational character.

This reasoning generates our first formal proposition:

Proposition 1: Organizational boundary permeability functions as a generative rather than merely instrumental property when it operates through constitutive symbiotic relationships; under these conditions, permeability produces emergent organizational capabilities that cannot be attributed to any individual actor within the relational assemblage and that bounded organizational forms cannot replicate through hierarchical coordination or transactional exchange. Empirical indicators of this proposition include: (a) positive associations between inter-organizational boundary permeability and innovative output that persist after controlling for resource access and information spillovers; (b) the non-portability of capabilities developed through constitutive symbiosis such capabilities should degrade when the relational context is disrupted, even when individual human capital is retained; and (c) the presence of emergent competencies that neither partner possessed prior to the relationship and that neither can articulate as a discrete transferable asset.

4.3. Dimension Two: Symbiotic Collaboration Logic

Existing organizational theory recognizes two primary logics of inter-organizational collaboration: transactional exchange, in which bounded actors exchange discrete resources or services at negotiated prices (Williamson, 1981), and relational governance, in which repeated interaction, trust, and shared norms reduce transaction costs and enable more flexible cooperation (Macneil, 1980; Dyer & Singh, 1998). Both logics share the assumption that collaboration occurs between pre-constituted organizational entities whose identities are stable prior to and independent of the collaborative relationship. The collaboration is a means to an end resource acquisition, risk sharing, capability access not a process through which the collaborating organizations become what they are.

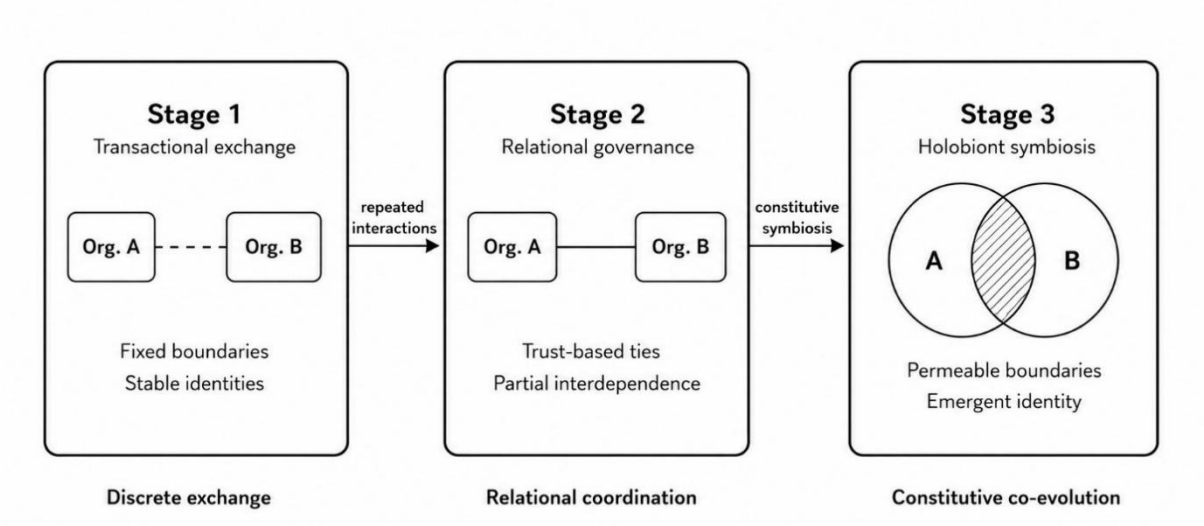
The holobiont framework introduces a third collaboration logic that we term symbiotic co-evolution. In biological holobionts, the relationship between host and microbiome is neither transactional nor merely relational in the dyadic sense; it is constitutive and co-evolutionary. The host does not merely use the microbiome as a resource; it co-evolves with it, such that the host's biological identity its immune repertoire, its metabolic capacity, its developmental trajectory is shaped by and inseparable from the microbial relationships it sustains. Reciprocally, the microbiome's composition, diversity, and functional profile are shaped by the host environment. Neither party remains what it was before the relationship; both are transformed through it, and the transformation is ongoing rather than completed at a single point in time.

Translated into organizational terms, symbiotic collaboration logic describes a mode of inter-organizational relationship in which the collaborating organizations are mutually constituted through their interaction in which the capabilities, identity, and strategic orientation of each organization are shaped by and inseparable from the relational assemblage in which it participates. This is distinct from strategic alliance logic, in which organizations pool resources while maintaining separate identities, and from ecosystem logic, in which organizations occupy complementary roles within a value architecture defined by a platform owner. In symbiotic collaboration, there is no stable prior identity that enters the relationship and no fixed role within a pre-defined architecture; there is only the ongoing co-evolutionary process through which organizational identities and capabilities are simultaneously produced.

This reasoning generates our second formal proposition:

Proposition 2: Symbiotic collaboration logic characterized by constitutive mutual transformation, co-evolutionary capability development, and the absence of stable prior organizational identities produces forms of inter-organizational competitive advantage that transactional exchange logic and relational governance logic cannot generate; specifically, symbiotic collaboration produces emergent system-level capabilities whose value is irreducible to the sum of the participating organizations' individual capabilities. Empirical indicators include: (a) positive network centrality effects on organizational performance that exceed what can be explained by resource access or information brokerage alone; (b) evidence that collaborating organizations are constitutively transformed over the course of their relationship measurable as changes in core capability profiles, not merely in peripheral competencies; and (c) capability degradation following the dissolution of symbiotic relationships even in the absence of personnel loss, indicating that the capability was a property of the assemblage rather than of the individual organization.

Figure 2: The transition from transactional exchange to holobiont symbiosis.



Source: Author's own design.

4.4. Dimension Three: Relational Organizational Identity

The question of organizational identity what an organization is, what makes it distinctive, what persists through change has been theorized primarily in terms of stability and boundedness. Albert and Whetten's (1985) foundational framework defines organizational identity as the central, distinctive, and enduring characteristics of an organization properties that are stable across time and distinguish the organization from others. This conception, while analytically influential, encodes a specific ontological assumption: that organizational identity is a property of the organization as a bounded entity, not a property of its relationships. Identity precedes relationship; the organization enters its relational environment with an identity already formed, and the task of boundary management is in part to protect that identity from relational contamination.

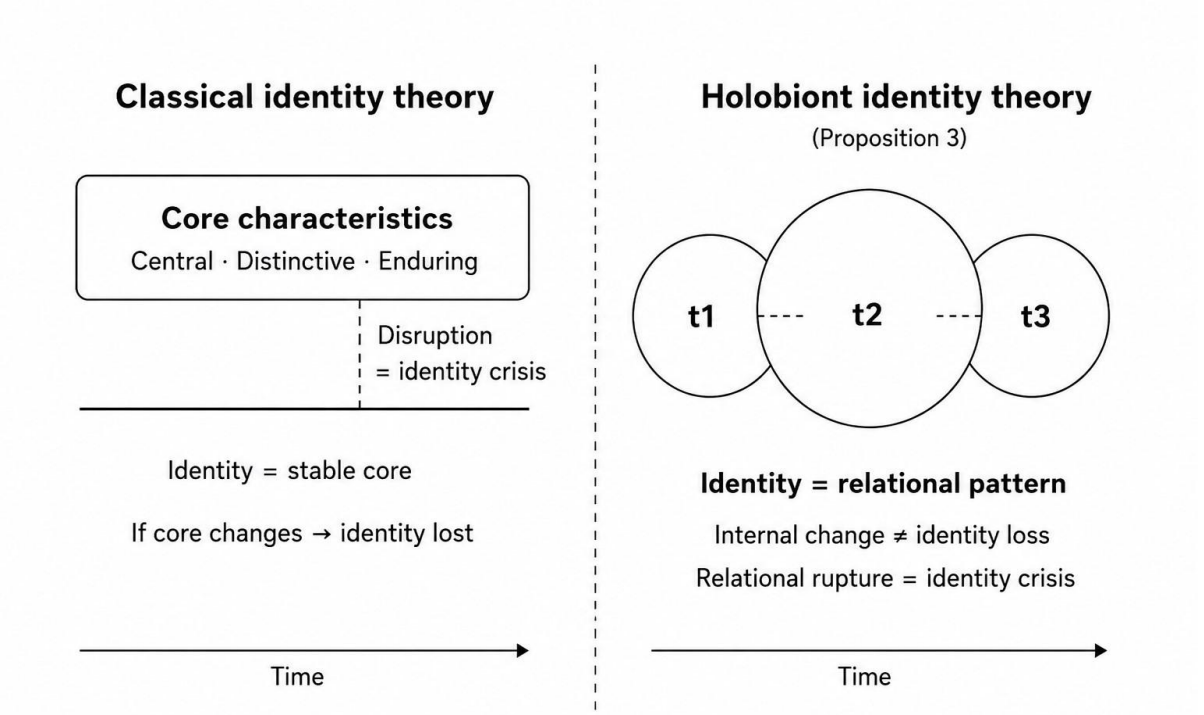
The holobiont framework challenges this assumption at its foundation. In biological holobionts, identity is not a property of the host organism considered in isolation; it is a property of the holobiont as a relational assemblage. The immune system that defends the "self" against foreign invaders is itself shaped by the microbiome the very symbionts that might appear to threaten the integrity of the self are constitutive of the self's capacity to recognize and respond to genuine threats. Organizational identity, viewed through the holobiont lens, is similarly relational and emergent: it is not what the organization is before it enters its relationships but what it becomes through them. Identity is not the anchor of boundary decisions; it is their emergent outcome.

This reconceptualization has significant implications for organizational theory. It suggests that the stability of organizational identity the sense in which an organization remains "the same organization" through change is not produced by maintaining a fixed set of core characteristics but by sustaining a coherent pattern of relational engagement. An organization that maintains the same symbiotic relationships while continuously transforming its capabilities, structures, and strategies exhibits a form of identity continuity that Albert and Whetten's framework cannot capture. Conversely, an organization that maintains stable internal characteristics while its relational context is disrupted may experience a more profound identity crisis than one that transforms internally while sustaining relational coherence.

This reasoning generates our third formal proposition:

Proposition 3: Organizational identity in holobiont organizational forms is relationally constituted and co-evolutionarily maintained; under conditions of deep boundary permeability and symbiotic collaboration, identity continuity is a function of relational pattern coherence rather than internal characteristic stability, such that organizations can undergo radical internal transformation while maintaining identity continuity through the preservation of their constitutive symbiotic relationships. Empirical indicators include: (a) greater stakeholder perception of identity continuity in organizations that maintain relational network stability through periods of internal restructuring, compared with organizations that preserve internal characteristics while undergoing relational disruption; (b) evidence that organizational reputation and legitimacy assessments by external actors track relational network position more closely than internal capability profiles in high-interdependence industries; and (c) longitudinal patterns in which organizational identity claims shift systematically following the gain or loss of constitutive relational partners, even absent changes in formal mission, leadership, or resource base.

Figure 3: Classical versus holobiont conceptions of organizational identity continuity.



Source: Author's own design.

4.5. The Holobiont Framework: An Integrated View

The three propositions developed above are analytically distinct but theoretically integrated. Proposition 1 establishes that boundary permeability is generative rather than merely instrumental when it operates through constitutive symbiosis. Proposition 2 establishes that symbiotic collaboration logic produces emergent competitive advantages that bounded organizational forms cannot replicate. Proposition 3 establishes that organizational identity in holobiont systems is relationally constituted and co-evolutionarily maintained. Together, they constitute a coherent theoretical framework in which boundary, collaboration, and identity are not three separate phenomena to be related but three dimensions of a single relational process the process through which the holobiont organization continuously constitutes itself through its symbiotic engagements with its environment.

This integrated view has a direct implication for organizational theory: it suggests that the most important unit of analysis for understanding competitive advantage, organizational resilience, and strategic adaptation in complex environments is not the bounded firm but the relational assemblage the holobiont organization and the co-evolutionary web of relationships through which it is constituted. This does not render existing theories obsolete; it repositions them as special cases of a more general framework in which hierarchical boundary logic applies when relational assemblages are not yet formed or have broken down, and holobiont logic applies when constitutive symbiosis is the dominant mode of organizational existence.

4.6. Illustrative Organizational Cases

To render the holobiont framework's theoretical claims tractable and to demonstrate their empirical purchase, we briefly examine three organizational cases that exhibit holobiont properties in paradigmatic form. These cases are not presented as definitive evidence for the framework's propositions; they are offered as existence proofs demonstrations that the phenomena the framework theorizes are empirically present and organizationally consequential, and that existing theories cannot adequately account for them.

The Linux/Apache open-source ecosystem. What began as a loosely coordinated network of volunteer developers has co-evolved over three decades into a system in which the identities, technical capabilities, and strategic

orientations of participating organizations IBM, Red Hat, Google, Intel, and thousands of smaller contributors are inseparable from their participation in the shared codebase (West & Gallagher, 2006; Dahlander & Magnusson, 2008). No participant enters the ecosystem with a stable prior identity that is merely expressed through contribution; each is constitutively shaped by the relational logic of open-source co-development. The boundary between IBM-as-firm and Linux-as-community is not anatomical but relational, continuously renegotiated through each commit cycle. Proposition 1 is directly illustrated: the permeability of IBM's boundary to the Linux commons is not a risk to be managed but the generative mechanism through which IBM's infrastructure capabilities are produced and renewed. Proposition 3 is equally visible: Red Hat's organizational identity what it was, what it could offer, why it was acquired by IBM for $34 billion in 2019 was a property of its relational position within the ecosystem, not of any internal characteristic it possessed independently of that position (West & Gallagher, 2006).

Toyota's keiretsu supplier network. Toyota's relationship with its first-tier suppliers is instructive because it has been interpreted through both TCE and relational governance frameworks and both, we argue, miss its most theoretically significant properties. Dyer and Nobeoka (2000) documented how Toyota's supplier network functions not as a set of bilateral exchange relationships governed by long-term contracts but as a knowledge-sharing community in which suppliers' production capabilities, quality standards, and problem-solving routines are constitutively shaped by their participation in the network. The Toyota Production System does not exist within Toyota; it exists within the relational assemblage of Toyota and its suppliers, and no participant could replicate it independently. Denso, Aisin, and Toyota Boshoku do not merely supply components; their organizational identities engineering culture, investment priorities, management practices have co-evolved with Toyota's over decades of constitutive symbiosis. Proposition 2 is directly illustrated: the emergent system-level capability represented by the Toyota Production System is irreducible to the sum of any individual participant's capabilities, and cannot be transferred or replicated outside the relational assemblage a prediction empirically supported by Toyota's consistently mixed results in replicating TPS quality in greenfield plants without established supplier networks (MacDuffie, 1995).

Biotechnology research consortia. The pre-competitive research consortia that characterize the biotechnology and pharmaceutical industries exemplified by the Structural Genomics Consortium, the Innovative Medicines Initiative, and open-science networks underlying COVID-19 vaccine development offer a third paradigmatic case. Powell et al. (1996), in one of the most influential empirical studies of inter-organizational knowledge creation, demonstrated that in biotechnology, the locus of innovation is the network rather than the firm: organizations more deeply embedded in constitutive inter-organizational relationships exhibit higher innovative performance not because they access more external resources but because their research capabilities are properties of the relational assemblage. A small biotechnology firm's scientific identity what it can do, what problems it can solve is inseparable from its network position. When that relational context is disrupted when a consortium dissolves, when a key partner is acquired the firm's capabilities do not remain intact: they disintegrate, because they were never properties of the firm alone. This is precisely the dynamic that Proposition 3 predicts and that TCE and RDT, with their assumptions of stable organizational capability endowments, cannot explain.

These three cases illuminate an important boundary condition for the framework. In each case, constitutive symbiosis is characterized by three identifiable properties: (1) temporal depth relationships sustained over years or decades; (2) mutual transformation each party's core capabilities are shaped by the relationship, not merely supplemented; and (3) distributed governance the assemblage is not governed by a stable architectural center but through shared norms, standards, and relational trust. Where these conditions are absent where relationships are episodic, instrumental, and hierarchically governed the holobiont framework does not apply, and TCE or ecosystem theory remains more appropriate. This three-condition specification guards against theoretical overextension: the claim is not that all inter-organizational relationships are constitutively symbiotic, but that an important and growing class of them are, and that this class is empirically identifiable.

5. Dialogue with Existing Theories

5.1. Positioning the Holobiont Framework

A theoretical contribution to organizational scholarship is evaluated not only by the novelty of the framework it proposes but by the precision with which it locates itself within the existing theoretical landscape. A framework that claims to explain everything explains nothing; a framework that identifies exactly what it adds to, where it departs from, and what it leaves untouched within existing theory demonstrates the kind of theoretical self-awareness that AMR's reviewers expect. In this section, we therefore engage directly with the three theoretical traditions most relevant to our framework transaction cost economics, resource dependence theory, and ecosystem/platform theory not to dismiss them but to map the precise contours of our contribution relative to theirs. We then address the limitations of the holobiont framework itself, in the spirit of theoretical honesty that rigorous conceptual work requires. Table 1 presents a comparison of organizational boundary theories.

Table 1: Comparison of organizational boundary theories

Theory	Boundary logic	Collaboration logic	Identity conception	Scope limitation
Transaction cost economics	Efficiency-based; fixed boundary around cost-minimizing demarcation	Transactional exchange between pre-constituted entities	Stable, pre-given; protected from relational contamination	Cannot theorize constitutive inter-organizational relationships
Resource dependence theory	Power-based; defensive perimeter against environmental pressure	Dependency management; cooperation as control strategy	Stable, autonomous; threatened by dependence	Cannot theorize organizations constituted by their environment
Ecosystem / platform theory	Architectural; defined by platform owner at system level	Complementary role-filling within governed architecture	Anchored in keystone firm; residual hierarchical centrism	Cannot theorize systems without a stable architectural center
Holobiont framework	Relational; permeable boundary as generative property	Symbiotic co-evolution; constitutive mutual transformation	Emergent and relational; sustained through relational pattern	Most applicable to constitutive symbiotic organizational forms

Source: Author's own design.

5.2. Transaction Cost Economics: From Efficiency to Constitution

Transaction cost economics remains the most influential framework for theorizing organizational boundaries, and our engagement with it must therefore be both respectful and precise. Williamson's (1981) framework offers a powerful and internally consistent account of why boundaries exist where they do: activities are internalized when the costs of market governance generated by asset specificity, uncertainty, and the threat of opportunism exceed the costs of hierarchical coordination. This is a genuine theoretical achievement, and the holobiont framework does not challenge it within its own domain of application.

What the holobiont framework challenges is the scope of that domain. TCE's boundary logic applies most powerfully when inter-organizational relationships are discrete, transactional, and governed by the threat of opportunism when, in other words, the parties to the relationship remain fundamentally separate entities whose identities and capabilities are independent of the relationship itself. This is precisely the condition under which TCE's make-or-buy calculus is meaningful. But it is not the condition that obtains in holobiont organizational forms. When organizations are constitutively transformed by their symbiotic relationships when their capabilities, identities, and strategic orientations are emergent properties of the relational assemblage rather

than portable assets that preexist the relationship the TCE question "should this activity be internalized or outsourced?" becomes theoretically malformed. You cannot internalize or outsource a relationship that constitutes you; you can only sustain it or dissolve it, and the consequences of dissolution are not efficiency losses but identity disruptions.

The holobiont framework therefore does not replace TCE; it identifies the boundary of TCE's explanatory domain and proposes a complementary framework for the organizational phenomena that lie beyond it. When relationships are transactional, TCE applies. When relationships are constitutive, the holobiont framework applies. The theoretical contribution is the identification and theorization of the constitutive case a case that TCE's foundational assumptions render invisible.

5.3. Resource Dependence Theory: From Control to Co-evolution

Resource dependence theory shares with TCE a fundamental assumption about organizational agency: organizations are bounded actors that strategically manage their relationships with the environment in order to secure resources, reduce uncertainty, and extend their control over critical dependencies (Pfeffer & Salancik, 1978). RDT's contribution was to make the political and power dimensions of boundary management visible to show that boundary decisions are not merely efficiency calculations but moves in an ongoing struggle for autonomy and control. This is a genuine and enduring theoretical achievement.

The holobiont framework engages RDT at the level of its foundational metaphor. RDT conceives of the organization-environment relationship as fundamentally adversarial: the environment threatens the organization with dependence, and the organization responds by seeking to reduce, absorb, or neutralize that dependence. Even cooperative strategies joint ventures, interlocking directorates, long-term contracts are understood within RDT as mechanisms for managing dependence rather than as relationships through which the organization is constituted. The environment is something to be managed, not something to be symbiotic with.

The holobiont framework proposes a different foundational metaphor: not the organization struggling to maintain autonomy against environmental pressure, but the organization co-evolving with its relational environment in a process through which both are transformed. This is not merely a rhetorical shift; it has substantive theoretical consequences. Where RDT predicts that organizations will seek to minimize dependence on any single external actor, the holobiont framework predicts that organizations engaged in constitutive symbiosis will actively deepen their interdependence with key relational partners not because they have failed to manage their dependencies but because deepening interdependence is the mechanism through which emergent capabilities are produced. The prediction is empirically distinguishable from RDT's prediction, and it applies to a class of organizational phenomena platform ecosystems, open innovation communities, inter-organizational knowledge commons that RDT consistently struggles to explain.

5.4. Ecosystem and Platform Theory: From Architecture to Assemblage

Ecosystem and platform theories represent the most recent and in some respects the most sophisticated attempts to theorize organizational boundaries in conditions of complex interdependence (Jacobides et al., 2018; Adner, 2017). These frameworks acknowledge that value creation increasingly occurs across organizational boundaries, through complementary relationships among multiple actors, and that the governance of these relationships requires analytical tools that go beyond both TCE and RDT. In this respect, ecosystem theory moves in the same direction as the holobiont framework, and the dialogue between them is correspondingly more nuanced.

The critical difference lies in the treatment of organizational identity and the role of the platform owner or keystone firm. In ecosystem theory, the architecture of the ecosystem the division of roles between platform owners and complementors, the rules of participation, the mechanisms of value capture is defined and governed by a central actor whose identity, strategic intent, and architectural authority anchor the system. The ecosystem is, in this sense, a hierarchical structure wearing relational clothing: it acknowledges interdependence but organizes it around a stable center. The holobiont framework challenges precisely this residual centrism. In a

holobiont organizational system, there is no stable center whose identity precedes and grounds the relational assemblage; there are only co-evolving actors whose identities emerge from and are sustained by the assemblage as a whole.

This distinction has practical consequences for how we theorize governance, competitive advantage, and resilience in complex organizational systems. Ecosystem theory predicts that system performance is primarily a function of the platform owner's architectural choices and governance decisions. The holobiont framework predicts that system performance is primarily a function of the quality and depth of symbiotic relationships throughout the assemblage and that systems governed by constitutive symbiosis will exhibit forms of resilience and adaptive capacity that architecturally governed ecosystems cannot replicate, precisely because their adaptive capacity is distributed across the entire relational assemblage rather than concentrated in a central governance structure.

5.5. Limitations of the Holobiont Framework

Theoretical honesty requires us to acknowledge the limitations of the framework we have proposed. Five limitations are particularly significant and deserve explicit attention.

First, the holobiont framework is most directly applicable to organizational forms characterized by deep, persistent, and constitutive inter-organizational relationships meeting the three conditions identified in the illustrative cases section: temporal depth, mutual transformation, and distributed governance. It is less directly applicable to organizations that operate primarily through discrete transactional exchanges or within stable hierarchical governance structures, and it is not intended to apply to early-stage alliances or project-based collaborations that have not yet achieved constitutive depth. We do not claim that all organizations are or should be holobiont organizations; we claim that a theoretically significant and empirically growing class of organizational forms exhibits holobiont properties, and that existing theory cannot adequately explain these forms. The scope of the framework is therefore bounded by the three-condition specification above, and future empirical work should test and refine these criteria.

Second, the holobiont framework's emphasis on constitutive symbiosis and relational identity raises difficult questions about organizational agency and accountability. If organizational identity is relationally constituted and co-evolutionarily maintained, it becomes theoretically unclear how we should attribute strategic decisions, moral responsibility, and legal accountability within the relational assemblage. This is not merely a practical concern; it is a theoretical one with direct implications for how we conceptualize intentionality and governance in holobiont organizational forms. The biological holobiont provides no resolution here biological organisms do not face legal accountability which means that the theoretical transfer reaches a genuine limit at this point. Future theoretical work must develop an account of distributed agency adequate to holobiont organizational forms, drawing potentially on recent work in process ontology (Langley & Tsoukas, 2017) and relational agency (Emirbayer, 1997) to theorize how strategic intentionality can be distributed across a relational assemblage without being dissolved into it.

Third, the holobiont framework, by foregrounding the generative potential of symbiotic relationships, risks undertheorizing the pathological dimensions of inter-organizational symbiosis. Biological holobionts are not invariably benign: parasitic relationships, opportunistic colonization, and symbiotic dysbiosis the breakdown of previously generative microbiome relationships are central features of holobiont biology with direct organizational analogues. Organizations engaged in ostensibly symbiotic relationships may experience dependency lock-in, capability appropriation, or identity erosion dynamics that the present framework does not systematically address. A complete holobiont organizational theory must account for the conditions under which constitutive symbiosis turns pathological: when boundary permeability becomes exploitative rather than generative, when co-evolution produces asymmetric dependence rather than mutual capability development, and when relational identity coherence slides into loss of strategic autonomy. These are not merely edge cases;

they are theoretically central to understanding the governance challenges facing holobiont organizational forms, and their neglect represents a significant gap in the framework as currently specified.

Fourth, the holobiont framework faces a non-trivial measurement challenge. Distinguishing constitutive symbiotic relationships from deep relational exchange i.e., from the most sophisticated forms of governance theorized by relational governance theory requires empirical criteria that the framework does not yet supply in operationalizable form. We have proposed three boundary conditions (temporal depth, mutual transformation, distributed governance), but each requires further specification: How many years constitute sufficient temporal depth? How much change in core capability profiles is required to demonstrate mutual transformation rather than peripheral learning? What governance mechanisms are sufficiently distributed to qualify as non-hierarchical? These are not merely measurement questions; they are theoretical questions about where constitutive symbiosis begins and deep relational exchange ends. Future work should develop and validate empirical instruments drawing on longitudinal network analysis, matched-pair capability assessments, and relational identity surveys capable of distinguishing holobiont organizational forms from their near neighbors.

Fifth, the biological foundations of our framework, while theoretically generative, carry the risk of what Tsoukas (1991) termed the "misplaced concreteness" of metaphorical reasoning the tendency to treat the structural features of the source domain as if they were literal properties of the target domain. We have been explicit throughout this paper that our theoretical transfer rests on structural homology rather than surface analogy, and that we do not claim organizations are holobionts in any literal sense. We have further specified the criterion for valid structural homology as the isomorphism of relational structures across domains, following Tsoukas (1991) and Morgan (1986). Nevertheless, the risk of misplaced concreteness is real and multi-directional: readers may import biological assumptions about fitness landscapes, selection pressures, or genetic transmission that the framework does not intend and that have no organizational analogue. We therefore recommend that subsequent applications of the holobiont framework be explicit about which biological mechanisms are being transferred and which are being deliberately set aside. The three mechanisms identified in this paper constitutive symbiosis, co-evolutionary boundary formation, and emergent identity are the load-bearing elements of the theoretical transfer. Other features of holobiont biology the genetic mechanisms of horizontal gene transfer, the immunological specificity of host-microbiome recognition are not part of the organizational framework and should not be imported by analogy.

6. Discussion and Conclusion

6.1. Theoretical Contributions

This paper set out to address a specific and consequential gap in organizational theory: the inability of existing frameworks to theorize organizational boundaries as relational, permeable, and co-evolutionary phenomena rather than fixed, jurisdictional, and hierarchically enforced demarcations. We have argued that this gap reflects not a deficiency in any particular theory but a shared epistemological assumption what we termed the jurisdictional boundary assumption that runs through transaction cost economics, resource dependence theory, and ecosystem frameworks alike. And we have proposed that the holobiont concept from evolutionary biology offers the conceptual architecture needed to fill this gap, through a framework built on three formal propositions concerning boundary permeability as a generative property, symbiotic collaboration logic, and relational organizational identity.

The theoretical contributions of this paper are three. First, we reconceptualize organizational boundaries as generative rather than merely protective phenomena. The dominant tradition in organizational boundary theory treats permeability as a problem to be managed a source of vulnerability, dependence, and identity dilution that must be carefully calibrated against the benefits of external access. The holobiont framework inverts this logic, proposing that boundary permeability is the mechanism through which emergent organizational capabilities are produced under conditions of constitutive symbiosis. This reconceptualization does not render existing boundary theories obsolete; it identifies the conditions under which their logic applies and proposes a complementary

framework for the conditions increasingly prevalent in contemporary organizational environments under which it does not.

Second, we introduce symbiotic collaboration logic as a theoretically distinct mode of inter-organizational relationship that existing frameworks cannot adequately capture. Transaction cost economics theorizes collaboration as transactional exchange between pre-constituted entities. Relational governance theory theorizes collaboration as trust-based exchange that reduces transaction costs while leaving organizational identities intact. Ecosystem theory theorizes collaboration as complementary role-filling within an architecturally governed value system. None of these frameworks theorizes the possibility that collaboration might be constitutive that organizations might become what they are through their symbiotic relationships rather than despite them. Symbiotic collaboration logic fills this theoretical space, proposing that the most consequential forms of inter-organizational competitive advantage emerge precisely from relationships that transform the collaborating organizations rather than merely connecting them.

Third, we develop a relational theory of organizational identity that challenges the stability and boundedness assumptions embedded in dominant identity frameworks. Albert and Whetten's (1985) conception of organizational identity as central, distinctive, and enduring has been enormously productive, but it rests on an ontological assumption that identity is a property of the bounded organization rather than of its relational context that the holobiont framework calls into question. We propose that in holobiont organizational forms, identity continuity is a function of relational pattern coherence rather than internal characteristic stability, generating a conception of organizational identity that can accommodate radical internal transformation while maintaining analytical coherence.

6.2. Implications for Future Research

The holobiont framework opens several productive directions for future empirical and theoretical research. We identify four that we consider most consequential. Table 2 presents the Holobiont organizational framework.

Table 2: Future research agenda for the holobiont organizational framework

Research direction	Key question	Suggested method	Related proposition
Identification of holobiont forms	What empirical criteria distinguish holobiont organizations from ecosystems and alliances?	Comparative case studies; longitudinal organizational analysis	Propositions 1, 2, 3
Formation and dissolution dynamics	When and how do inter-organizational relationships become constitutive? What follows dissolution?	Process studies; historical analysis of inter-organizational relationships	Propositions 1, 2
Governance of holobiont systems	How are holobiont systems governed without a stable architectural center?	Ethnographic studies; OSS communities; research consortia	Proposition 2
Holobiont logic and sustainability	How does relational identity reshape corporate responsibility and ecological governance?	Mixed methods; stakeholder network analysis; longitudinal sustainability studies	Proposition 3

Source: Author's own design.

The first and most immediate concerns the empirical identification and characterization of holobiont organizational forms. Our framework proposes that a theoretically significant class of organizations exhibits

holobiont properties constitutive boundary permeability, symbiotic collaboration logic, and relational identity but we have not specified the empirical conditions under which these properties are most likely to emerge. Future research should develop criteria for identifying holobiont organizations in practice, drawing on case study methodologies and comparative organizational analysis to map the range and diversity of holobiont organizational forms across industries, institutional environments, and historical periods.

The second direction concerns the dynamics of holobiont formation and dissolution. Biological holobionts are not formed instantaneously; they emerge through extended co-evolutionary processes in which host and symbiont gradually become constitutively interdependent. The organizational analogue of this process the transition from transactional or relational exchange to constitutive symbiosis is theoretically underspecified in our framework and represents a rich agenda for future theoretical and empirical work. When and how do inter-organizational relationships become constitutive? What organizational and environmental conditions facilitate or impede the emergence of symbiotic collaboration logic? What happens when holobiont organizational forms dissolve when constitutive symbiotic relationships are severed and how do the component organizations reconstitute their identities in the aftermath?

The third direction concerns the governance of holobiont organizational systems. Our critique of ecosystem theory's residual centrism raises an important practical question: if holobiont organizational systems are not governed by a stable center, how are they governed? The holobiont framework suggests that governance in these systems is distributed, emergent, and co-evolutionary that it arises from the pattern of symbiotic relationships rather than from the architectural decisions of a central actor. But this is a theoretical claim that requires substantial empirical and theoretical development. Future research should examine the governance mechanisms of organizations that exhibit holobiont properties open source software communities, inter-organizational research consortia, platform ecosystems without dominant platform owners with the goal of developing a theory of distributed governance adequate to the complexity of holobiont organizational forms.

The fourth direction concerns the relationship between holobiont organizational logic and sustainability. The holobiont concept has deep connections to ecological thinking to the recognition that organisms are not isolated entities but participants in complex webs of interdependence whose health depends on the health of the whole. This ecological dimension of the holobiont framework has direct implications for organizational sustainability theory, suggesting that the most resilient and adaptive organizations are not those that most effectively defend their boundaries against environmental pressure but those that most deeply embed themselves in constitutive symbiotic relationships with their social and ecological environments. Future research should develop the connections between holobiont organizational theory and sustainability scholarship, exploring the implications of relational organizational identity for corporate social responsibility, stakeholder theory, and the governance of organizational impacts on ecological systems a direction that resonates with the growing body of work on sustainability, green innovation, and environmental governance (Yazıcı & Çiçeklioğlu, 2025; Yazıcı et al., 2025).

7. Conclusion

We began this paper with a question that organizational theory has not adequately answered: where does one organization end and another begin? We end it with a different question one that the holobiont framework makes it possible to ask: how do organizations become what they are through the relational assemblages in which they participate? This is not merely a reframing of the original question; it is a reconceptualization of what organizational theory is trying to explain. The holobiont framework proposed in this paper does not offer a final answer to this reconceptualized question. It offers a theoretical starting point a set of concepts, mechanisms, and propositions that make the question answerable in ways that existing frameworks do not. The boundary of the organization, we have argued, is not a line to be drawn and defended but a relational achievement to be continuously produced through symbiotic engagement with the organizational environment. Organizational identity is not a stable property to be protected but an emergent outcome of co-evolutionary processes. And competitive advantage, in holobiont organizational forms, is not a possession of the bounded firm but a property of the relational assemblage as a whole.

These are strong theoretical claims, and they deserve the scrutiny of empirical investigation and theoretical critique. We offer them not as conclusions but as invitations to organizational scholars who study the boundaries of firms, the logic of collaboration, and the nature of organizational identity, and who find, as we have, that the most interesting phenomena in contemporary organizational life lie precisely at the edges of what existing theory can see. From hierarchy to holobiont: the journey is not from one organizational form to another but from one way of seeing organizations to another. And it begins, as all theoretical journeys do, with the willingness to ask a question that the existing map cannot answer.

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Ethical Statement

Conflict of Interest: Nothing to declare. **Funding:** Nothing to declare. **Peer Review:** Double-blind.