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Abstract

Climate impacts like heatwaves, droughts, and extreme storms increasingly force organizations to adapt. Many adaptation strategies are unsustainable: actions that protect firms today can deplete ecological resources, create new vulnerabilities, or shift risks onto other communities and future generations. We argue that adaptation becomes sustainable only when understood not as reactive adjustment but as organizational and institutional transformation within planetary limits. We identify a theoretical blind spot in management research, which has focused mainly on mitigation while overlooking the unique challenges adaptation poses to organizations. Drawing on examples from the wine industry, we illustrate how maladaptive practices emerge and why adaptation raises distinctive organizational challenges. We outline a research agenda to advance sustainable adaptation by avoiding maladaptation, balancing short- and long-term horizons, and navigating firm- and collective-level decision-making. This agenda centers on adaptation's unique ecological embeddedness, deep uncertainty, and how its risks and responsibilities are temporally and spatially distributed.

Keywords: climate change, resilience, corporate sustainability, clean technologies, environmental justice and ethics

In June of 2022, a heat wave followed by an unseasonal hailstorm tore through the vineyards of Bordeaux, destroying much of the year's harvest. As such extreme events become more frequent, the businesses that define the region's economy face an existential question: how do we adapt to survive in a changing climate? Winemakers who once thrived on tradition now struggle to find solutions that will sustain them without causing further damage.

This challenge is not unique to viticulture. Around the world, organizations grapple with increasingly severe climate impacts that threaten operations and long-term viability. However, climate adaptation is often unsustainable, as adapting today can exhaust resources for the future.

For example, when firms intensify reliance on scarce water and energy resources, they may resolve immediate challenges but exacerbate long-term shortages and deplete organizational resilience. This raises a pressing question: how can adaptation strategies protect people and livelihoods without causing new environmental harm or undermining long-term climate goals?

We argue that adaptation becomes sustainable only when theorized and practiced as organizational and institutional transformation within planetary boundaries. This shift requires abandoning the illusion that organizations can adapt their way out of climate change while maintaining business as usual. It demands three fundamental departures from conventional management thinking: recognizing organizations as embedded within ecological systems; developing decision-making frameworks that acknowledge deep uncertainty and irreversible thresholds; and confronting the temporal and spatial distribution of adaptation's costs and benefits. Sustainable adaptation demands different theories of organizational change that reflect the ecological systems on which organizations depend.

Adaptation Raises Theoretical Blind Spots in Management Research

Management research has primarily focused on mitigation, aiming to minimize climate change and its adverse impacts on ecosystems and society through strategies such as efficiency measures, net-zero commitments, and carbon disclosure. Our historic emphasis on mitigation assumed that we would eventually prevent climate change and avoid the need for adaptation. That assumption has failed. Although mitigation research has generated valuable theoretical insights, it has proven insufficient to guide firms toward robust preventive action in practice: emissions, temperatures, and climate volatility continue to rise. Meanwhile, far less scholarly attention is devoted to adaptation (Linnenluecke et al., 2013; Rivera et al., 2022), the strategies firms adopt to cope with already unfolding climate impacts. Yet previous research has not adequately considered how and why adaptation is often maladaptive, nor how it can become more sustainable by also considering the need for mitigation. This imbalance matters for both research and practice: climate change is already reshaping the core assumptions of organizational life (Nyberg & Wright, 2022), and as more firms shift from mitigation toward adaptation, management scholarship risks offering frameworks that were never designed for the challenges adaptation actually poses. The blind spot

concerns climate-driven change, because adaptation makes its biophysical and uncertain nature impossible to ignore. Importantly, some adaptation strategies may help organizations build the resilience they need to survive in the long term, whereas other strategies are maladaptive, eroding that resilience.

The theoretical gap around adaptation reflects a deeper limitation in organizational theory. Climate adaptation introduces distinct forms of change that existing frameworks have not fully incorporated: biophysical feedbacks that are irreversible, uncertainty that is irreducible, and ethical and distributive choices across generations. Building on systems thinking approaches in management scholarship (Dentoni et al., 2020; Grewatsch et al., 2021), we argue that climate adaptation intensifies ecological interdependence in ways that demand further theoretical development. While systems perspectives have examined socio-ecological resilience and cross-sector partnerships, adaptation foregrounds dynamics that differ fundamentally from socially constructed or market-driven change—emerging instead from shifting ecological systems with their own nonlinear rhythms and limits (Hoffman & Jennings, 2021). Each of these three forms of change creates distinct theoretical challenges.

First, climate adaptation redefines the scope of an organization's "environment." In most management research, environments refer to markets, competitors, or institutions (Nyberg & Wright, 2022). Under climate change, however, the environment becomes biophysical and reactive. Droughts, fires, and floods are ecological feedbacks shaped by human activity, collapsing the conceptual boundary between organizations and ecosystems—often in ways that cannot be undone.

Second, climate adaptation takes place under deep uncertainty—we cannot confidently specify how climate-society systems work, how likely different futures are, or what outcomes decision-makers should prioritize. Climate impacts unfold amid dynamic and unknown thresholds and tipping points for which past experience offers little guidance.

Third, climate adaptation introduces distributive and temporal consequences that extend across communities and generations. Decisions that safeguard firms today may create vulnerabilities for others tomorrow, redistributing risks over time to actors with limited power to shape current choices.

In sum, adaptation challenges organizational theory because climate-driven change entails new ecological interdependence, dynamic thresholds, and long-term distributive spillovers that existing frameworks have not fully incorporated.

Risks of Maladaptive Practices

Well-intentioned adaptation strategies can inadvertently create new vulnerabilities and undermine future adaptive capacities (Clément & Rivera, 2017). These maladaptive strategies assuage short-

term concerns but have unintended consequences (Nava et al., 2025): refrigeration prevents crops from spoiling during heat waves but increases electricity demand and greenhouse gas emissions. Resources dedicated to adaptation reduce what could be dedicated to mitigation and may lead to technology lock-in on ineffective solutions.

From a theoretical standpoint, maladaptation reveals tensions in organizations' learning and control under deep uncertainty. Climate systems are nonlinear and entwined with organizational activity, such that interventions intended to stabilize one process can destabilize another. Put bluntly: organizations cannot control their way out of climate impacts. A strategy that safeguards one organization may shift risks to others, across supply chains, communities, or future generations.

The wine industry exemplifies these tensions. Relocating vineyards may help producers adjust to new climatic conditions, but can accelerate habitat loss by clearing previously untouched ecosystems. Irrigation, widely used to mitigate drought stress, exacerbates water scarcity for surrounding communities and ecosystems. And even switching grape varieties within existing farmlands can disrupt ecosystems by eliminating historic varieties. Switching grapes may further have impacts on businesses and communities, eroding cultural heritage while reducing consumer recognition of regional brands.

Toward Sustainable Adaptation

Adaptation is often framed as a trade-off, but opportunities exist for strategies that support survival today while reinforcing mitigation and resilience tomorrow. Indeed, prior climate research highlights potential win-win scenarios more than persistent paradoxes (Van der Byl & Slawinski, 2015), and some strategies integrate both adaptation and mitigation dimensions. Adaptation is not inherently maladaptive.

This approach aligns with calls for tackling wicked problems through systems thinking (Grewatsch et al., 2021). Sustainable adaptation requires understanding adaptation as a process of organizational and institutional transformation that respects planetary boundaries (Williams et al., 2025). Organizations must cultivate reflexivity—awareness of how present decisions shape future vulnerabilities—and embed adaptation within broader systems of collective resilience.

In the wine industry, diversifying grape varieties enhances biodiversity and soil resilience while maintaining yields. Precision agriculture paired with sustainable management reduces water waste and greenhouse gas emissions. Energy efficiency upgrades protect workers and harvests from rising heat while lowering energy demand. Solar panels provide reliable electricity during heatwaves while reducing reliance on fossil fuels. Industry collaborations like the Porto Protocol foster communities of practice dedicated to effective climate responses.

These examples illustrate a spectrum between adaptation and mitigation, where some strategies are purely adaptive while others are purely mitigative, but the most sustainable approaches integrate both dimensions. Precision agriculture paired with cover cropping represents "adaptive mitigation"—simultaneously building resilience to drought while sequestering carbon. Solar installations embody "mitigative adaptation"—reducing emissions while creating energy security during climate shocks. Such integrated strategies challenge the traditional separation between adaptation and mitigation practices, suggesting that sustainable responses must address both present vulnerabilities and future climate stability.

Sustainable adaptation is distinguished from maladaptive, reactive adjustment by three characteristics. First, it regenerates rather than depletes the resources it relies on. Second, it distributes risks and benefits equitably across stakeholders and time horizons. Third, it builds adaptive capacity through organizational learning and institutional flexibility, developing portfolios of responses rather than locking into single solutions.

These cases illustrate that sustainable adaptation is an organizational, institutional, and distributive challenge—not primarily about technologies but about governance systems, learning processes, and interdependence across actors and ecosystems. Yet previous research has not adequately considered how and why adaptation is often maladaptive, nor how it can become more sustainable. Below, we articulate a research agenda that informs management theory while shaping more sustainable climate adaptation.

Research Agenda for O&E Scholars

To advance sustainable adaptation, scholars must critically examine both tensions and compatibilities of current practices. While natural scientists and engineers develop technical solutions, management scholarship must illuminate how these solutions are developed, implemented, and institutionalized. Adaptation exposes theoretical blind spots arising from biophysical embeddedness, uncertainty, and distributive justice. Addressing them is essential for identifying and governing sustainable adaptation strategies.

Avoiding Maladaptation

Although sustainable adaptation is possible, predicting which practices will become maladaptive remains difficult. Maladaptation reveals the limits of prediction and organizational control in dynamic, partially unknowable ecological systems. This raises an uncomfortable question: if we cannot reliably predict which adaptations will succeed, how can management scholarship guide organizational action? Future research should identify the conditions under which adaptation strategies backfire, creating new vulnerabilities. How can organizations identify and prevent maladaptive responses that undermine mitigation or resilience? What adaptive strategies are less likely to generate feedback loops that lock firms into ineffective technologies and policies?

Balancing Short- and Long-Term Horizons

Mitigation secures long-term climate stability, whereas adaptation ensures organizational viability in the near term. Climate adaptation intensifies tensions between immediate survival and long-term sustainability by introducing deep uncertainty—where futures cannot be inferred from experience, and short-term gains may impose long-term ecological or social costs. Who within organizations is responsible for making adaptation decisions—and with what information, authority, and time horizon? How do available measures implicitly incentivize sustainable or maladaptive practices?

Navigating Firm and Collective Decision-Making

Climate change affects all, yet its impacts and responses are unevenly distributed. The central provocation is this: Can firms legitimately adapt to protect their own interests when doing so harms others or future generations? How do firms coordinate with governments, NGOs, and local actors to achieve sustainable adaptation, and who bears the costs and benefits? How can participatory processes leverage stakeholder knowledge while preventing exclusion of marginalized voices? Which institutional arrangements foster effective collaboration under deep uncertainty, and which reinforce power asymmetries? What moral obligations do organizations have to communities and ecosystems they depend on but do not control?

In sum, adaptation requires rethinking organizational theory—shifting from models centered on social and market environments toward frameworks that recognize ecological interdependence, irreducible uncertainty, and normative responsibility.

A Call to Action

Adaptation is often framed as a pragmatic necessity, a means of protecting livelihoods and assets from climate shocks. However, for management scholars, it represents much more: it is an intellectual and moral inflection point that compels us to re-examine the foundations of organizational theory. The question is not whether organizations will adapt—they must—but whether management scholarship will rise to theorize adaptation in ways that serve ecological and social flourishing, not just organizational survival.

Maladaptation reveals these challenges vividly. Each instance of a well-intentioned adaptation that backfires—by consuming scarce resources, externalizing risks, or exacerbating inequities—demonstrates the limits of current frameworks. Recognizing maladaptation is not about identifying managerial errors but about understanding how organizations reason and act when the rules of their environment are themselves shifting.

For management research, sustainable adaptation marks a new frontier. It calls for theories that address irreversible change, interdependence, and moral responsibility. It challenges us to

theorize resilience as co-evolution of organizations' capacity to sustain themselves alongside the ecological and social systems they depend on.

For practitioners, three questions can distinguish sustainable from maladaptive responses: Does this strategy maintain or restore the resources it uses? Who benefits and who bears the costs across supply chains, communities, and future periods? Have we established monitoring systems and governance structures capable of detecting and correcting course when adaptation generates unintended consequences?

Adaptation is no longer peripheral to management research but central to understanding organizational life in the Anthropocene. If adaptation is inevitable, our task is ensuring it is sustainable—ecologically grounded, socially just, and organizationally reflexive.

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Declaration of Conflicting Interests

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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Biographies

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