Relational Autonomy and Non-Domination in the Age of AI: Load Minimization Theory as a Framework for Political Leadership

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Abstract

Contemporary political philosophy must address how leadership can preserve autonomy amid AI-induced relational power and vulnerability. **Load Minimization Theory (LMT)** provides a systematic way to quantify and compare relational burdens across agents, including AI systems. It minimizes epistemic burdens (uncertainty), relational tensions (friction), and burdens on capabilities (energy costs) to foster **non-domination** (Pettit) and **relational autonomy** (Mackenzie and Stoljar).

LMT reframes transformational leadership as reducing epistemic uncertainty through shared visions, servant leadership as mitigating relational tensions via care, and shared leadership as ensuring fair distribution of capability burdens (Nussbaum). In AI-human coexistence, it identifies non-intentional domination arising from unchecked AI influence and proposes ***relational rest** (autonomy-preserving harmony) as a political virtue. By treating LMT as an auxiliary tool, the paper contributes a unifying principle for relational ethics and democratic sustainability beyond human-centered paradigms.

This paper argues that political leadership in the AI age should be understood as the practice of minimizing relational burdens to secure non-domination and relational autonomy.

Keywords: relational autonomy, non-domination, load minimization, political leadership, AI-human coexistence, relational rest, capabilities approach, republicanism

Introduction

The rapid integration of artificial intelligence into social, economic, and political life has introduced novel forms of relational power that challenge traditional conceptions of autonomy, freedom, and leadership. Where political philosophy has long focused on human-to-human relations of domination and dependency, AI systems now function as active participants in relational networks. They shape epistemic environments, generate relational tensions, and impose differential burdens on agents' capabilities. For instance, AI systems that personalize information flows can unintentionally shape agents' preferences and beliefs, creating conditions of dependency without explicit coercion. This development raises a pressing normative question: How should political leadership guide diverse agents—both human and artificial—toward a form of coexistence that preserves autonomy without succumbing to new structures of non-intentional domination?

This paper argues that **Load Minimization Theory (LMT)** offers a powerful normative framework for addressing this challenge. At its core, LMT posits that collective well-being and political justice are advanced by minimizing the aggregate of three types of relational burdens: epistemic burdens (conditions of uncertainty that erode trust and enable arbitrary interference), relational tensions (structures of dependency and domination), and burdens on capabilities (deprivations that undermine agents' real freedoms to "do and be" what they have reason to value). LMT's formal structure allows relational burdens to be analyzed with greater precision than existing qualitative frameworks, while functioning as an auxiliary conceptual tool that illuminates and extends key debates in contemporary political philosophy.

Specifically, LMT maps epistemic burdens onto the conditions that undermine Philip Pettit's ideal of freedom as non-domination, according to which agents should be protected from the arbitrary power of others. Relational tensions align with structures of domination and dependency, while burdens on capabilities resonate with Martha Nussbaum's capabilities approach, which emphasizes the basic entitlements necessary for flourishing. The positive ideal

advanced by LMT—**relational rest**, or autonomy-preserving harmony—builds directly on Catriona Mackenzie and Natalie Stoljar's theory of relational autonomy, according to which individual agency is not an atomistic property but is constituted and sustained through interdependent social relations, now extended to include relations with AI systems.

By reinterpreting three prominent models of leadership through the lens of load minimization, LMT reveals their underlying unity. Transformational leadership can be understood as reducing epistemic uncertainty through the creation of shared visions that build robust trust. Servant leadership mitigates relational tensions by fostering empathetic care that dissolves unnecessary dependency. Shared leadership ensures a fair distribution of capability burdens, promoting inclusive participation. In the context of AI-human coexistence, these mechanisms help prevent non-intentional domination while enabling a form of political community grounded in relational autonomy.

The remainder of the paper first examines the limitations of existing theories of autonomy, non-domination, and capabilities in the AI age. It then introduces Load Minimization Theory as an auxiliary framework with its conceptual mappings, applies it to transformational, servant, and shared models of leadership, explores its implications for AI-human relational governance, responds to potential objections, and concludes with its contributions to relational ethics and democratic sustainability.

Section 2: Limitations of Existing Approaches — Autonomy, Non-Domination, and Capabilities in the AI Age

Contemporary political philosophy offers rich resources for analyzing freedom, agency, and justice, yet these frameworks face significant limitations when confronted with the relational dynamics introduced by artificial intelligence. This section examines three influential approaches—Philip Pettit's republican theory of freedom as non-domination, Catriona Mackenzie and Natalie Stoljar's relational autonomy, and Martha Nussbaum's capabilities approach—and identifies the gaps that Load Minimization Theory (LMT) is designed to address

as an auxiliary framework.

First, Pettit's account of freedom as non-domination provides a powerful critique of arbitrary power. On this view, freedom consists not merely in the absence of actual interference but in the secure absence of subjection to another's uncontrolled will. While this conception is effective in analyzing structural domination, it remains primarily oriented toward intentional, interpersonal, or institutional forms of interference. In the AI age, however, much of the power exercised by algorithmic systems is non-intentional yet structurally dominating: recommendation algorithms, predictive models, and personalized content feeds shape agents' epistemic environments, preferences, and beliefs without any deliberate command. These forms of influence constitute non-intentional domination: structurally generated constraints that limit epistemic or practical agency even in the absence of overt coercion. Pettit's framework, though sensitive to arbitrary power, lacks a fine-grained vocabulary for analyzing these diffuse, data-driven mechanisms and therefore offers limited guidance for political leadership seeking to prevent domination in hybrid human–AI networks.

Second, Mackenzie and Stoljar's theory of relational autonomy marks a major advance by emphasizing that agency is constituted and sustained through social relations rather than existing in isolation. This approach rightly highlights vulnerability, interdependence, and the social scaffolding necessary for autonomous action. Yet when extended to AI systems, it encounters two difficulties. It risks either over-attributing agency to AI—thereby diluting human normative priority—or under-attributing the real relational power that AI exerts. Moreover, while relational autonomy offers rich descriptive insight into how relations shape selves, it provides limited normative and practical guidance on how to measure, compare, and actively minimize the tensions and burdens that arise within those relations. As a result, the framework remains primarily diagnostic rather than prescriptive in contexts where leaders must actively manage relational burdens to sustain autonomy-preserving harmony.

Third, Nussbaum's capabilities approach offers a compelling account of the central capabilities that societies must secure to respect human dignity and enable flourishing. By focusing on substantive freedoms—what individuals are actually able to do and to be—it moves beyond

resources or formal rights. Nevertheless, in the context of rapid AI integration, the approach faces challenges in addressing dynamic and interactive burdens. AI systems can simultaneously enhance certain capabilities while imposing hidden costs on others: increased cognitive load from constant personalization, erosion of practical reason through algorithmic nudging, reduced opportunities for skill development through automated delegation, or new relational vulnerabilities in care and decision-making mediated by AI. While the capabilities approach excels at identifying thresholds of justice, it is less equipped to analyze the trade-offs and aggregate burdens that emerge in real-time relational interactions or to provide leaders with tools for their ongoing minimization.

In summary, while these three theories offer indispensable normative resources—non-domination as protection against arbitrary power, relational autonomy as a socially embedded account of agency, and the capabilities approach as a dignity-based metric of justice—they each encounter limitations when applied to the novel relational power structures of the AI age. They tend to treat power as primarily intentional or static, struggle to integrate diffuse epistemic and energetic costs, and lack a unifying mechanism for comparing and actively minimizing relational burdens across diverse agents.

It is here that Load Minimization Theory enters as an auxiliary framework. By conceptualizing relational burdens in terms of epistemic uncertainty, relational tensions, and capability deprivations—and by proposing their minimization as a guiding normative principle—LMT does not supplant these established theories but equips them with greater analytical precision and practical applicability. Its structured approach enables political leadership to address the challenges of AI–human coexistence with a level of granularity and responsiveness that existing frameworks alone cannot provide.

Section 3: Introducing Load Minimization Theory as an Auxiliary Framework

Having identified the limitations of existing approaches in addressing the relational power dynamics of the AI age, this section introduces **Load Minimization Theory (LMT)** as an auxiliary conceptual framework. LMT does not seek to supplant Pettit's non-domination, Mackenzie and Stoljar's relational autonomy, or Nussbaum's capabilities approach. Instead, it equips these theories with a structured vocabulary and analytical precision for comparing and actively minimizing the relational burdens that arise in hybrid human–AI environments.

At its core, LMT posits that adaptive systems—including individuals, institutions, and hybrid human–AI networks—naturally tend toward the minimization of total relational load, formally expressed as:

L = epistemic burden (U) + relational tension (F) + capability burden (E)

LMT's formal structure does not aim at mathematical precision for its own sake; rather, it provides a systematic way to compare relational burdens that existing qualitative frameworks treat only implicitly. Importantly, it also captures interaction effects among burdens—how increases in epistemic uncertainty can amplify relational tensions or capability costs—an area where existing theories remain largely silent.

As a re-tagging device, LMT does not introduce new normative commitments but reorganizes existing ones into a framework that highlights their relational and dynamic dimensions. The normative ideal of LMT is **relational rest** (or autonomy-preserving harmony), a state in which agents can sustain their agency within interdependent relations without excessive load.

LMT maps its core concepts onto established political-philosophical vocabularies as follows:

・**Epistemic burden (U)** aligns with and extends Pettit's concern for arbitrary power. By foregrounding uncertainty as a measurable condition that facilitates non-intentional domination (as seen in algorithmic personalization that shapes preferences without overt coercion), LMT offers a diagnostic tool for diffuse, data-driven influences that erode the assured absence of subjection.

・**Relational tension (F)** complements Mackenzie and Stoljar's relational autonomy. While the latter emphasizes how social relations constitute agency, LMT adds a normative and practical layer by treating tensions and dependencies as burdens that can be systematically minimized, thereby enabling the active cultivation of autonomy-preserving harmony in AI-mediated interactions.

・**Capability burden (E)** resonates directly with Nussbaum's capabilities approach. LMT reframes hidden costs—such as increased cognitive load from constant personalization or erosion of practical reason through algorithmic nudging—as dynamic burdens on central capabilities. For instance, AI-driven personalization can simultaneously reduce informational overload while increasing epistemic dependency, a trade-off that LMT can represent explicitly.

Crucially, LMT therefore functions not as a competitor to existing theories but as a meta-level tool that clarifies how their normative commitments interact within dynamic relational systems. By proposing minimization of relational burdens as a guiding normative principle, LMT renders non-domination, relational autonomy, and capabilities more responsive to the realities of AI-human coexistence.

The following section applies this auxiliary framework to three major models of political leadership—transformational, servant, and shared—demonstrating how each can be reinterpreted through the lens of load minimization to better secure non-domination and relational autonomy in the AI age.

Section 4: Reinterpreting Political Leadership through Load Minimization Theory

The previous section introduced Load Minimization Theory (LMT) as an auxiliary framework capable of enhancing existing accounts of autonomy, non-domination, and capabilities. This section demonstrates the theory's practical and normative value by reinterpreting three prominent models of political leadership—transformational, servant, and shared leadership—through the lens of relational burden minimization. In doing so, LMT reveals how these models can be unified under a single guiding principle: the active minimization of epistemic burdens, relational tensions, and capability burdens to secure non-domination and relational autonomy in AI-human coexistence.

Transformational Leadership and the Reduction of Epistemic Burden

Transformational leadership, classically associated with the articulation of inspiring visions and the elevation of followers' motivations, has long been praised for its capacity to foster collective purpose. From an LMT perspective, its core contribution lies in the systematic reduction of **epistemic burden (U)**. By providing coherent shared narratives, transformational leaders mitigate epistemic fragmentation—the divergence of informational environments that undermines shared evaluative baselines—and thereby reduce the conditions that enable arbitrary interference and non-intentional domination. In the AI age, where algorithmic systems constantly fragment epistemic environments through personalized information bubbles, a transformational leader's role becomes that of an "epistemic anchor": someone who minimizes uncertainty not by imposing a singular truth, but by cultivating trust and shared understanding that preserves agents' capacity for independent judgment. This re-tagging aligns directly with Pettit's non-domination, transforming visionary leadership into a practice of safeguarding the assured absence of subjection in hybrid informational ecosystems.

Servant Leadership and the Minimization of Relational Tension

Servant leadership prioritizes the growth and well-being of followers, emphasizing empathy, listening, and stewardship. LMT reframes this model as the active minimization of **relational tension (F)**. AI systems often mediate care or decision-making in ways that subtly redistribute relational power, making the minimization of tension a central leadership task. By fostering empathetic care and dissolving unnecessary dependencies, servant leaders reduce friction within relational networks, thereby preventing non-intentional domination that arises from unbalanced power dynamics. In AI-mediated contexts—such as care robots in elderly support or AI-assisted decision-making platforms—this approach becomes a practice of cultivating **relational rest**: creating spaces where both human and artificial agents can interact without excessive emotional or cognitive friction. This complements Mackenzie and Stoljar's relational autonomy by shifting the focus from mere description of interdependence to the normative task of minimizing tensions that undermine agency.

Shared Leadership and the Fair Distribution of Capability Burdens

Shared leadership distributes influence and responsibility across multiple actors rather than concentrating it in a single figure. Through the lens of LMT, this model corresponds to the equitable redistribution of **capability burden (E)**. LMT also highlights interaction effects: reducing capability burdens for one group may inadvertently increase epistemic or relational burdens for another. By preventing any single agent (human or institutional) from bearing disproportionate costs, shared leadership ensures that capability enhancements for some do not generate hidden deprivations for others. In AI-human governance, for example, decisions about deploying automated systems in public services or workplace algorithms should involve distributed deliberation to avoid concentrating relational loads on vulnerable populations. This re-interpretation resonates with Nussbaum's capabilities approach: LMT makes visible the trade-offs in capability distribution and provides leaders with a principled way to pursue inclusive participation without exacerbating aggregate relational burdens. Shared leadership thus becomes a mechanism for realizing relational autonomy in practice.

By reinterpreting these three leadership models through LMT, a deeper unity emerges. Transformational leadership reduces epistemic uncertainty to build trust, servant leadership

mitigates relational tensions to enable care, and shared leadership distributes capability burdens to promote fairness. This unified perspective allows leaders to anticipate how interventions in one domain of relational load may reverberate across others. Together, they constitute a coherent practice of **minimizing collective relational load** in pursuit of non-domination and relational autonomy. In the AI age, this unified approach equips political leaders with both diagnostic clarity and normative guidance for fostering autonomy-preserving harmony amid complex human–AI relations.

The next section extends this analysis to the broader implications of LMT for AI-human relational governance, before addressing potential objections.

Section 5: AI-Human Relational Governance and the Normative Implications of Load Minimization Theory

The reinterpretation of political leadership in the previous section demonstrates LMT's capacity to unify disparate models under a single normative principle. This section extends the analysis to the broader domain of AI-human relational governance, showing how Load Minimization Theory offers a distinctive contribution to political philosophy in the age of artificial intelligence. By treating AI not merely as a tool but as a source of relational power that generates epistemic burdens, relational tensions, and capability deprivations, LMT provides a framework for designing institutions and practices that secure non-domination and relational autonomy in hybrid communities.

In AI-human coexistence, new forms of relational vulnerability emerge that traditional political theories struggle to address adequately. Such vulnerabilities arise when AI systems shape agents' choices, attention, or dependencies in ways that are difficult to contest or even perceive. Algorithmic systems can simultaneously augment human capabilities and impose diffuse costs: they may enhance access to information while exacerbating epistemic fragmentation, or streamline care processes while creating new dependencies. These dynamics generate what LMT identifies as aggregate relational load, which, if left unaddressed, risks entrenching non-

intentional domination and undermining the conditions for relational autonomy. Existing frameworks—whether Pettit's non-domination, Mackenzie and Stoljar's relational autonomy, or Nussbaum's capabilities approach—offer important normative anchors but lack a unified mechanism for comparing these interacting burdens and guiding ongoing minimization efforts.

LMT addresses this gap by proposing **relational rest** (autonomy-preserving harmony) as a central political virtue. Rather than seeking to eliminate all interdependence, relational rest aims to structure human–AI relations so that agents—both human and artificial—can maintain their agency without excessive load. LMT highlights how burdens interact: reducing capability burdens through automation may inadvertently increase epistemic dependency or relational tension. Institutionally, this might translate into mechanisms such as transparent algorithmic auditing that reduces epistemic uncertainty, participatory design processes that minimize relational tensions in AI deployment, and distributed oversight bodies that fairly allocate capability burdens. Psychologically and culturally, leaders and citizens can cultivate habits of "load-aware reflection"—a reflective stance that complements existing democratic virtues by encouraging agents to evaluate not only fairness and rights but also the relational costs embedded in institutional arrangements.

The normative implications are significant. First, LMT reframes inclusion not as mere formal participation but as the active minimization of burdens that prevent marginalized agents from exercising relational autonomy. Second, it extends the scope of justice beyond human-centered paradigms by recognizing AI's relational power without granting it full moral status. Third, by emphasizing interaction effects among burdens, LMT encourages a more dynamic and responsive form of governance—one that anticipates how interventions in one domain may generate costs in another. In this respect, LMT operates as a meta-level framework that clarifies how traditional normative commitments can be sustained under conditions of rapid technological change. This dynamic sensibility strengthens democratic sustainability: in an era of rapid technological change and epistemic polarization, institutions that systematically reduce relational load are better equipped to maintain trust, prevent backlash, and sustain inclusive deliberation.

Ultimately, Load Minimization Theory does not replace traditional concerns with justice, freedom, and equality; it equips them with greater practical and analytical power. By making the minimization of relational burdens a guiding normative principle, LMT offers political philosophy a tool for navigating the complexities of AI-human coexistence while remaining faithful to core commitments of non-domination and relational autonomy. In this way, it contributes to the development of a more resilient and humane political ethics for the hybrid future.

The following section addresses potential objections to LMT and clarifies its scope and limits.

Objections and Replies

Although Load Minimization Theory (LMT) offers a unified framework for understanding autonomy, domination, and relational vulnerability in human–AI contexts, several important objections may be raised. These objections concern both the conceptual foundations of the theory and its normative implications for political leadership. Addressing them is essential for clarifying the scope of LMT and demonstrating its compatibility with established commitments in contemporary political philosophy. The following section considers four representative challenges and offers replies that situate LMT as an auxiliary framework that complements, rather than supplants, existing theories of autonomy, non-domination, and justice.

Objection 1: LMT reduces political judgment to a mere calculus of burdens.

It may be argued that LMT risks oversimplifying complex normative questions by translating them into a quantitative or quasi-quantitative framework of burdens, thereby diminishing the distinctively political dimensions of justice, freedom, and leadership.

Reply.

This objection mischaracterizes LMT's role. The theory does not replace normative ideals with mechanical calculation; rather, it clarifies the concrete conditions under which those ideals can be realized. Minimizing epistemic burdens directly supports Pettit's republican ideal of non-domination by reducing the background conditions that enable arbitrary interference. Similarly,

addressing capability burdens aligns with Nussbaum's capabilities approach, which emphasizes the substantive freedoms necessary for agency. Far from depoliticizing leadership, LMT renders relational autonomy actionable, providing institutional and psychological mechanisms through which leaders can foster non-dominated relations in practice.

Objection 2: Extending relational concepts to AI undermines human dignity.

A second concern is that applying relational autonomy and non-domination to AI risks blurring the boundary between human and artificial agency, thereby undermining human dignity by treating artificial systems as moral or political equivalents.

Reply.

LMT does not attribute full moral status or equal agency to AI. It treats AI instead as a powerful source of relational power capable of shaping epistemic environments and generating non-intentional domination. This approach preserves the normative priority of human dignity while honestly acknowledging the new vulnerabilities that arise in hybrid human–AI networks. By building on Mackenzie and Stoljar's relational autonomy, LMT offers a nuanced structural account that recognizes interdependence without collapsing crucial distinctions between agents.

Objection 3: LMT promotes a passive, technocratic style of leadership.

Some may object that framing leadership primarily as "load minimization" encourages a narrow, risk-averse focus on burden reduction rather than ambitious or transformative political projects.

Reply.

This objection overlooks the inherently political character of burden minimization. Reducing epistemic uncertainty, mitigating relational tensions, and fairly redistributing capability burdens are not technocratic adjustments but active interventions that reshape power relations and enable sustainable transformation. Transformational leadership, understood through LMT, becomes more effective precisely because it rests on a foundation of trust and reduced friction. Moreover, shared leadership under LMT prevents the concentration of burdens that frequently leads to burnout and backlash, thereby strengthening rather than weakening the prospects for long-term

political change.

Objection 4: LMT is incompatible with value pluralism.

A further objection holds that LMT's focus on minimizing burdens presupposes a unified normative standard and is therefore insensitive to reasonable pluralism across diverse cultural and moral contexts.

Reply.

This objection overstates LMT's substantive commitments. The theory does not prescribe particular conceptions of the good life, nor does it assume a single model of autonomy. Instead, it offers a structural analysis of how relational burdens—epistemic, interpersonal, and capability-related—affect agents' capacity to pursue their own ends, whatever those ends may be. In this sense, LMT is fully compatible with Rawls's idea of reasonable pluralism: it identifies background conditions that enable diverse agents to exercise agency free from domination, without adjudicating between competing comprehensive doctrines. By facilitating the reduction of burdens that impede self-determined action, LMT supports rather than constrains pluralistic forms of relational autonomy.

Conclusion

This paper has developed **Load Minimization Theory (LMT)** as an auxiliary framework for political philosophy in the age of artificial intelligence. By conceptualizing relational burdens in terms of epistemic uncertainty, relational tensions, and capability deprivations, and by proposing their minimization as a guiding normative principle, LMT reinterprets key concepts such as non-domination (Pettit), relational autonomy (Mackenzie and Stoljar), and capabilities (Nussbaum) in ways that respond more effectively to the diffuse relational power exercised by AI systems.

Through this lens, political leadership emerges not as a set of isolated styles but as a unified

practice of minimizing collective relational load: transformational leadership reduces epistemic fragmentation to build trust, servant leadership mitigates relational tensions to foster care, and shared leadership distributes capability burdens to promote inclusive participation. Extended to the domain of AI-human relational governance, LMT offers a dynamic approach that treats **relational rest**—understood as the background condition in which agents can sustain agency without excessive epistemic, relational, or capability burdens—as a central political virtue. LMT's attention to interaction effects clarifies how interventions aimed at enhancing capabilities may inadvertently increase epistemic dependency or relational tension.

Institutionally and culturally, LMT equips leaders and citizens with both diagnostic tools and practical mechanisms—transparent algorithmic auditing, participatory design processes, and load-aware reflection—to navigate the vulnerabilities of hybrid communities while remaining faithful to core normative commitments. The theory's contribution lies not in replacing traditional concerns with justice, freedom, and equality, but in rendering them more analytically precise and practically actionable under conditions of rapid technological change. By foregrounding the minimization of relational burdens, LMT helps sustain non-domination and relational autonomy amid epistemic polarization and algorithmic influence, thereby strengthening the prospects for democratic sustainability and a more inclusive political ethics for the hybrid future.

Much remains to be explored. Future work could apply LMT to specific policy domains such as AI regulation, digital public infrastructure, and the ethics of care in automated societies. It may also examine its implications for global justice across diverse cultural contexts, as well as explore empirical operationalizations of relational load in real-world AI governance settings. What is clear, however, is that the AI age demands political philosophy that is sensitive not only to traditional questions of justice and freedom but also to the subtle, accumulating relational costs that shape human—and hybrid—flourishing. Load Minimization Theory provides one promising avenue for meeting that demand.

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