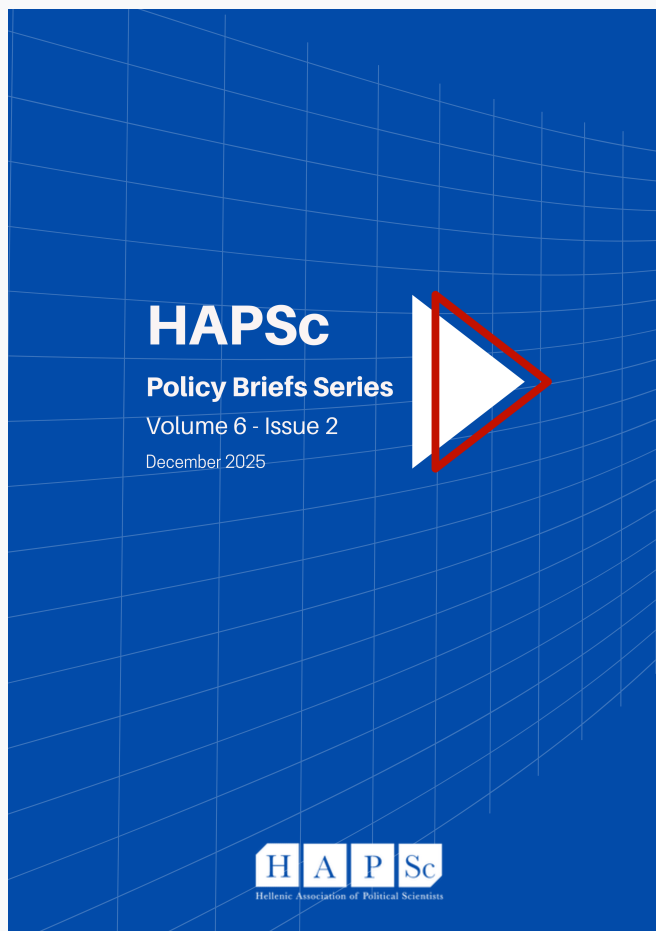


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Building Adaptive Collective Intelligence: A Blueprint for the Next Generation Governance¹

Konstantinos Zafeiris², Aikaterini Lioudaki³, Vasiliki Zafeiri⁴

Abstract

Adaptive Collective Intelligence (ACI) offers a governance model emphasising participation, learning, and coordination to manage complexity with trust and resilience. It promotes human-AI teamwork in sensing, deliberating, and adapting, transforming ideas into policies through fair oversight and digital inclusion. Drawing from democratic growth and challenges (like health, economy, migration, and religion) ACI views contradictions as opportunities for renewal. It incorporates ethical pluralism and intercultural dialogue to foster trust. In practice, it supports social foundations, participatory planning, and shared governance through interoperable platforms and feedback loops that turn input into flexible strategies. Combining diversity with data-driven improvements, ACI sees governance as a continuous learning process that protects rights and scales from pilots to national and international levels. The goal is a future-ready system that turns uncertainty into growth, linking innovation and fairness to build more equitable, effective public institutions.

Keywords: Adaptive Collective Intelligence; Governance; Participation; Digital Platforms; Ethical Pluralism; Resilience

Introduction

In today's rapidly changing world, traditional political systems and governance structures face more challenges than ever before. Globalisation, climate change, technological advances, and increasing social complexity are highlighting the limitations of static, hierarchical, and bureaucratic models. These traditional frameworks often struggle to keep pace with volatile, uncertain, complex, and ambiguous environments because they lack the flexibility and responsiveness needed. Therefore, there is a need for a shift towards adaptive governance systems that leverage collective intelligence, promoting a dynamic, inclusive, and data-driven decision-making process that can better respond to these challenges.

ACI offers an exciting new approach to future governance. It beautifully combines the richness of human diversity in thought with innovative digital tools, creating a multi-layered system that can learn, adapt, and respond to the needs of our society as they arise. By gathering everyone's opinions

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through citizen participation and combining them with skill-based choices at higher levels, ACI goes beyond the limits of current political systems. It uses continuous feedback, artificial intelligence, and teamwork to foster resilience and trust in how we govern.

This article explores the basic ideas, key components, and practical applications of ACI. It examines how adaptive governance can address economic, social, ethical, and environmental issues through teamwork and stakeholder participation. By proposing a balanced approach that combines technological progress with human values, this project aims to inspire new ideas for creating more equitable, sustainable, and effective governance worldwide. The article concludes by highlighting future research opportunities and policy guidelines that are vital for unleashing the full power of adaptive collective intelligence in governance.

Theoretical Foundations of Adaptive Collective Intelligence

‘When threatened, the first thing democracy abandons is Democracy.’

Mignon McLaughlin

ACI combines knowledge from collective intelligence research, adaptive governance theory, and socio-technical systems design to create governance systems that can learn, evolve, and coordinate actions across different scales, even in the face of uncertainty. Collective intelligence highlights how different groups, under the right conditions, can outperform individuals in solving complex problems, especially when there are suitable structures for exchanging ideas, discussion, and collaboration in networks and tasks. At the same time, adaptive governance aims to strike a balance between stability, accountability, and rapid adaptation through decentralisation, stakeholder participation, and continuous learning in response to ever-changing environments. By integrating these areas with AI-based digital tools and analytics, ACI aims to develop multi-level governance systems with rich feedback that adapt in real time (Chen et al., 2024).

Conceptually, ACI supports three key pillars: cognitive diversity, iterative learning, and polycentric coordination. It promotes diversity through platforms and processes that organise participation, mobilisation, and role clarity, transforming scattered knowledge into practical policy ideas. Iterative learning involves monitoring, evaluating, and testing scenarios to improve rules and strategies, strengthening resilience through continuous adjustments rather than one-off reforms. Polycentric coordination links local experiments with higher-level strategies, enabling bottom-up problem discovery and top-down support to address the scale mismatches often found in complex systems. This structure aligns with emerging ideas of collective adaptation, showing how groups reshape networks and strategies as challenges evolve over time (Sassi et al., 2022).

ACI design requires transparent governance of the collaboration itself: incentives for participation, transparent decision-making rights, and mechanisms for resolving conflicts and building trust between institutions and communities. Evidence shows that engagement persists when participants see tangible successes, reciprocity, and fair representation, highlighting the importance of metrics and feedback loops that make collective progress visible and accountable. Notably, the academic community warns that adaptive governance may function poorly if power asymmetries, legal embeddedness, and institutional memory are not adequately addressed. Therefore, ACI must integrate flexibility with enforceable accountability and protection of rights. In conclusion, the theoretical framework of ACI supports a model of governance where human and machine intelligence jointly shape policy through structured participation, continuous learning, and multi-level coordination - transforming instability into a catalyst for institutional evolution rather than failure (Boucher et al., 2023).

Core Components of the Adaptive Collective Intelligence System

'Democracy is government of the people, by the people, for the people.'

Abraham Lincoln

ACI governance has a multi-level framework grounded in feedback, with participatory processes and advanced technology, ensuring flexible, resilient decision-making even in complex scenarios. It uses a hybrid, multi-level system that promotes local autonomy and global coordination, and is adaptable to challenges such as climate resilience and resource management. Governance extends to the local, regional, and international levels: local for grassroots initiatives, regional for cross-border cooperation, and global for strategic planning and resource sharing. This polycentric structure reduces rigidity and maintains unity through standard protocols (Yasmin et al., 2022).

At the heart of ACI are mechanisms designed for ongoing feedback and flexible adaptation. These include real-time monitoring systems, stakeholder consultations, and adaptive planning tools that respond to new data, helping us stay resilient in changing environments. For example, state-reinforced adaptive governance models demonstrate how coordination among different levels of government can enhance the resilience of irrigation systems by integrating community input alongside policy directives (Chai et al., 2025).

Participatory democracy is the foundation that activates citizens by involving everyone in open discussions and decision-making. At higher levels, meritocratic selection brings in experts to guide important choices, creating a balanced mix of skills and perspectives. This combined approach values diverse thinking, offers equal opportunities for participation, and encourages discussions that

leverage our collective wisdom. In addition, technology plays an important role, with tools such as real-time data analysis, AI-based applications, and digital platforms helping us do more, facilitating more informed and data-driven decision-making processes in complex organizational environments (Efthymiou et al., 2020a). Examples such as participatory budgeting or online consultation platforms show how digital tools enhance transparency and engage more people in meaningful ways (Mckee, 2025). Together, these components create a governance ecosystem that is responsive, inclusive and scalable, transforming collective inputs into adaptive strategies.

Designing Collaborative Networks and Stakeholder Engagement

‘Civilised peoples gain power through the vote of the many, are governed by the ability of the few, and achieve greatness through the inspiration of one.’

Eleftherios Venizelos

Creating collaborative networks starts with understanding the key stakeholders, clarifying roles, and establishing co-creation routines that encourage public, private, and civic actors to work together smoothly. Studies of real networks show that how people are connected can vary significantly across contexts, with the density and centralisation of these networks linked to better budget management and cost control. Designing ‘governance games’ that focus on shared visions and negotiated trade-offs can make complex constraints and benefits more transparent for all participants, helping everyone stay aligned and committed as the project progresses. When managing integrated resource areas, combining governance analysis with structured co-creation activities can significantly boost the management of resource connections and make implementation more feasible (Sušnik, 2024).

Trust is vital for collaborative governance, which is built through face-to-face interactions, early successes, mutual understanding, and steady commitments to reduce perceived risks. Public confidence in government influences willingness to cooperate and attitudes toward public-private partnerships in a nonlinear way, underscoring the importance of transparency and consistent feedback. Power-sharing institutions, such as participatory budgeting and citizens' assemblies, can restore legitimacy by treating residents as co-governors. Socio-technical tools, such as shared data dashboards and standards, help build trust, stabilise expectations, and improve coordination between organisations (Suandi et al., 2024).⁵

⁵ Digital deliberation platforms like Polis help gather input at scale and ensure everyone's voice is heard, allowing anonymous statements and votes to reveal agreement or disagreement, thus aiding clearer policies. Adding machine learning visualises opinions, groups' ideas, and summarises discussions in real-time to support moderators and officials. Effective online engagement designs aim for inclusivity, prevent harassment, ensure transparent moderation, and connect

Effective network governance thrives when feedback systems help us monitor relationships, ensure fair participation, and track results. By regularly adapting roles, forums, and protocols as circumstances change, we create a flexible, resilient structure. Supportive coordination from authorities, such as legal rules, resources, and compatibility, provides a strong foundation while allowing local teams to experiment and respond quickly. All these thoughtful choices transform stakeholder networks into vibrant, adaptable communities full of trust, capable of identifying problems, discussing options, and taking bold action on a large scale - something that traditional hierarchies often struggle to match (Uddin et al. 2023).

Economic and Social Dimensions of Adaptive Collective Intelligence

'An excellent democracy has neither too many rich nor too many poor citizens.'

Thales of Miletus

ACI is based on the social economy, focusing on participatory planning and peer production. This ensures that resource distribution aligns with social value and justice. In Europe, the social economy includes cooperatives, mutual funds, associations, and social enterprises that reinvest surpluses to serve social objectives under democratic management. The EU Social Economy Action Plan reinforces this by improving access to markets, skills, and networks, supporting the creation of public-civic value, while respecting different views. It complements broader social governance efforts, such as the European Semester, which harmonises economic and social policies and promotes inclusion, employment, and social investment (European Commission, 2021).

Participatory economics offers design principles for self-management and planning that ACI can adopt. Worker and consumer councils share decision-making based on impact. Iterative participatory planning merges decentralised proposals into workable plans. Remuneration based on effort reduces inequalities. Guides illustrate practical arrangements and coordination rules, demonstrating realistic ideas beyond utopia (Wetzel, 2003).⁶

Commons-Based Peer Production (CBPP) facilitates collaborative sharing of knowledge, software, and increasingly, physical resources. It enables communities to co-create and manage assets using licenses that support open reuse and prevent privatisation. The Open Food Network shows how CBPP

input to decisions. Comparing various e-participation tools - from budgeting sites to online voting - assist in selecting suitable tools based on their purpose, audience, and inclusivity (Pentland & Tsai, 2024, pp. 3-5).

⁶ The urgency for such innovation is underscored by democratic crises, where, as observed, 'when threatened, the first thing democracy abandons is democracy'. This paradox - where democratic principles are violated in democracy's name - exists from Latin America's inequalities to the EU's democratic deficit, emphasising the need for adaptive systems that uphold democratic integrity under pressure (Zafeiris, Zafeiri, & Lioudaki, 2020, pp. 11-12).

extends to agricultural and food systems, using protected commons licenses to balance coordination, empowerment, and mission. Analysis reveals that open and limited-access commons differ in governance, allowing ACI to tailor institutional approaches for specific sectors while maintaining openness as a core principle for public digital infrastructure (Krewer, 2025).

From a social perspective, the ACI encourages inclusion by promoting co-creation and redistribution strategies that align with the EU's social governance objectives.⁷ This approach strengthens legitimacy and social harmony through democratic participation in value creation and sharing. Support for social economy ecosystems, centred around networked intermediaries, helps spread collaborative and commons-based models across different regions and sectors. This strengthens resilience and ensures that common missions remain aligned at a larger scale. By combining economic and social elements such as support for the social economy, participatory design, and governance of digital commons, ACI links innovation with justice, transforming collective intelligence into lasting, equitable prosperity (European Commission, n.d.).

Ethical, Cultural and Religious Perspectives

'No one can be completely free unless everyone is free.'

Herbert Spencer

ACI governance truly thrives when it combines diverse ethical perspectives, religious values, and intercultural dialogue. This inclusive approach helps legitimise and sustain thoughtful decision-making and care for our planet. Ethics - based on ideas such as mutual respect, empathy, social responsibility, and dignity - serves as the heart of ACI, guiding fairness in decision-making and outcomes, even when there are many different opinions and debates. These ethical narratives frequently resonate with the teachings of major religious traditions, providing valuable resources on our shared journey towards sustainability and the development of resilient, thriving communities (Modise, 2025).⁸

Throughout history, religion has both unified and polarised societies, shaping governance and ethics. Modern liberalisation and secularism led to religious fundamentalism as a reaction to imposed

⁷ A good example of a mature institutional framework for data governance, on which ACI systems can be developed, is the recent European data governance framework, as reflected in the NDC analysis (NDC, 2025, pp. 16-18).

⁸ Religious views on nature and stewardship are gaining recognition in global policy. Initiatives like UNEP's Faith for Earth and COP28's Faith Pavilion showcase how faith groups contribute morally and socially to climate and sustainability efforts. Traditions such as Judeo-Christian, Islamic, Hindu, and Buddhist promote stewardship ideas - like 'care for creation', 'Khilafah', or harmony with nature - that challenge human-centric perspectives and emphasise the inherent value of all beings. These beliefs inspire actions supporting biodiversity and shared responsibility (Ives, et al., 2024, pp. 2,6).

rationality and worldviews. The effort for religious liberalisation and secularism created fundamentalism, which emphasised the infallibility of sacred texts and tradition. Today, social and economic crises foster polarised ideologies, turning religion into a field of ideological and cultural conflict. These conditions challenge democratic institutions and require reflective, cross-cultural dialogue and reforms to reconcile contradictions and exclusion (Zafeiris et al., 2020).

Intercultural dialogue opens up a wonderful path to understanding different perspectives on ethics and religion. It encourages respect, promotes tolerance, and helps resolve conflicts peacefully. UNESCO and the Council of Europe strongly support dialogue as a valuable way to prevent social divisions, combat prejudice, and build consensus around democratic and human rights values across different cultures. Recent research shows how well-organised intercultural efforts can strengthen empathy, build strong alliances, and inspire new solutions to common challenges (Ratzmann, 2019).

Moral and spiritual leaders, such as indigenous communities and religious groups, are now seen as ‘moral catalysts’ - essential agents of change in global environmental governance. Their shared stories of integrated ecology and spiritual care for our Earth inspire us to move beyond simple technical solutions, emphasising values such as solidarity, humility, and long-term responsibility. Of course, turning these beliefs into real action means bringing people together, resolving differences, and working harmoniously across religions and cultures (Zepeda, 2025).

Incorporating ethical, cultural, and religious perspectives into ACI enhances legitimacy, encourages collective action, and builds lasting sustainability alliances. By grounding governance in cross-cultural values and institutionalising dialogue and collaboration, ACI can address societal ethical needs and lead transformative global responses.

Practical Implementation and Case Studies

‘Knowledge without action is foolish; action without knowledge is dangerous.’

Johann Goethe

The implementation of ACI begins with pilot projects and experimental zones that test multi-level governance in controlled environments for iterative improvement before broader use. Pilot projects on climate risk in the Arctic show how adaptive governance incorporates stakeholder feedback and flexible planning to enhance resilience, emphasising ‘learning by doing’ with stakeholder monitoring and input. The Greek ‘LIFE-IP AdaptInGR’ project is piloting adaptive strategies in 13 areas, focusing on climate vulnerability, cross-sectoral coordination, and capacity building in the areas of water, agriculture, and urban planning. These ‘living labs’ inform policy adaptations, highlighting the

importance of evaluation frameworks for monitoring results and learning from failures (Anisimov et al., 2020).

Digital platforms and AI tools play a crucial role in real-world ACI applications, making it easier for more people to get involved and make data-informed decisions, while similar technologies have already demonstrated their transformative potential in healthcare management and crisis response (Efthymiou et al., 2020b). In Halmstad Municipality, Sweden, e-governance platforms such as digital citizen portals support participatory budgeting and better service delivery, with AI helping analyse sentiment and gather feedback to respond more effectively. Ukraine's digital governance efforts during wartime, including platforms that ensure service continuity even amid conflict, demonstrate how AI-powered tools can help maintain public trust and keep operations running smoothly during tough times. Broader examples, such as the EU's water management pilot programs, demonstrate how platforms facilitate coordination across different regions, using AI to model various scenarios and improve resource management (Gustaffson et al., 2025).

The lessons learned underscore the importance of finding an ideal balance between flexibility and accountability. Pilot programs often reveal where power differences and scale mismatches can occur, indicating the need for polycentric structures to connect local efforts with global goals. Successfully scaling up these efforts involves embedding adaptive systems into policies, such as the Gold Standard Adaptation Framework, which uses pilot programs to improve climate finance measurements and stakeholder inclusion. Moving from local trials to global governance requires cross-layer learning, strong institutional memory, and digital interoperability - things that help us stay connected and avoid fragmentation (Eshuis & Gerrits, 2019).

Overall, these implementations illustrate ACI's potential to evolve governance through evidence-based iteration, with digital tools amplifying collective capacity. Future efforts should prioritise equitable access and ethical AI integration to ensure inclusive scaling (Wang et al., 2018).

From Chaos to Cohesion: Designing Freedom-Preserving Governance in ACI

'Where everyone is free to do whatever he wants, no one actually does; where there is no 'master', everyone is a master; and where everyone is a master, everyone is a slave.'

Jacques Bénigne Bossuet

The tension between absolute freedom and structured authority, famously highlighted by Bossuet's observation that 'where everyone can do whatever they want, in reality no one does what they want', sums up a fundamental paradox faced by social and governance systems. This paradox warns that

without defined leadership or governance, collective action risks chaotic turmoil, and, conversely, excessive concentration of power can lead to tyranny. ACI addresses this dilemma by designing systems that balance actors' autonomous participation with coordinated governance structures. Unlike traditional hierarchical models, ACI uses polycentric governance and adaptive feedback mechanisms to enable continuous self-correction and flexible decision-making, while maintaining individual autonomy.

The principles outlined in 'Building Adaptive Collective Intelligence' emphasise that freedom must be combined with self-imposed constraints that are dynamically adjusted to avoid the pitfalls of both anarchy and authoritarianism. The success of ACI lies in hybrid intelligence systems that integrate human action with algorithmic facilitation, enabling meaningful participation at various levels of expertise while ensuring coherent action. This approach leverages decentralised participation enhanced by technological mediation, such as AI-assisted decision-making frameworks, to promote both adaptability and control. By leveraging the balance between autonomy and structured coordination, ACI offers a path to protect human freedom from degenerating into uncontrolled chaos or oppressive domination, supporting the next generation of resilient, intelligent governance (Galesic et al., 2023).

Conclusion

Exploring the journey toward Adaptive Collective Intelligence, we see a governance approach designed to flourish amid the complexities and contradictions of our time. Supported by both theory and history, ACI learns from the evolution of democracy, emphasising the importance of participation, flexibility, and collective wisdom, especially when different voices such as political, social, ethical, and religious come together. At its core, ACI addresses many modern challenges, from balancing health, the economy, and immigration to spiritual values in a diverse society. Rather than seeing these contradictions as obstacles, adaptive systems turn them into opportunities for reflection, renewal, and building stronger alliances.

By incorporating digital tools and participatory platforms, ACI embraces technological innovation to encourage open, transparent citizen participation. This helps overcome traditional barriers to representation and legitimacy. Its ethical and religious dimensions, grounded in historical and sociological knowledge, emphasise the importance of dialogue, intercultural understanding, and values-based change. Contemporary experience, characterised by increasing uncertainty, polarised narratives, and calls for structural reforms, shows that enduring democratic systems need more than

just institutional frameworks. They must create adaptive networks, cultivate trust, and incorporate mechanisms for continuous learning and improvement.

ACI also offers a dynamic framework where human autonomy and algorithmic guidance evolve together, enabling resilient governance that protects freedom through continuous adaptation and participatory decision-making. This approach lays the foundation for governance systems that are both flexible and inclusive, responsive to the demands of complex, ever-changing environments.

In summary, ACI suggests a flexible, evolving governance approach grounded in universal principles and shaped through continuous participation and dialogue. By harnessing the power of collective intelligence, digital innovation, and ethical diversity, it promises to navigate complex societal changes and foster communities that are fairer, stronger, and more inclusive. The ongoing challenge, as both ancient and modern voices remind us, is to keep our focus on the bigger picture amid rapid change - to ensure democracy, in any form, helps us move closer to the shared good, rather than more profound confusion.

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Appendix

Indicative Comparison Table of Governance Systems

System of Government	Governance Structure	Economy	Individual Freedoms	Citizen Participation	Innovation/ Adaptability	Institutional Stability
Adaptive Collective Intelligence (ACI) System	Flexible, multi-center, networked	Hybrid with social economy and innovation	Protected within collective frameworks	Continuous, multi-layered, tech-enabled	Continuous learning and adaptation	Adaptive stability
Liberal Democracy	Elected representatives with separation of powers	Free market with government control	Strong legal protections	Elections and political activity	Moderate, via democratic processes	High with constitutional institutions
Participatory Democracy	Direct citizen involvement in decisions	Social control of the economy	Collective decisions may restrict individual freedoms	Active, direct involvement	Rapid response to public demands	Moderate, depends on participation
Direct Democracy	Citizens vote on all issues	Collective economic decisions	Tyranny of the majority	All participate in all decisions	Slow due to consensus	Low, hard decision-making
Representative Democracy	Elected representatives make decisions	Hybrid economy	Constitutional protections	Mainly through elections	Moderate, via electoral cycles	High
Social Democracy	Parliamentary system with social state	Social market economy	Balance of individual and social rights	Elections and social organization	Progressive reform	High with social institutions

System of Government	Governance Structure	Economy	Individual Freedoms	Citizen Participation	Innovation/ Adaptability	Institutional Stability
Liberalism	Limited state, individual freedoms	Free market, minimal government	Max individual freedom	Limited, mainly economic	Market-driven, Quick adaptation	Moderate, market fluctuations
Conservatism	Gradual change, traditional institutions	Traditional market economy	Limited for order preservation	Limited, via traditional institutions	Slow, cautious toward change	High, emphasis on tradition
Communism	Proletariat dictatorship	Centrally planned economy	Collective interest	Mandatory participation in party activities	Slow, ideologically constrained	Low, revolutionary changes
Socialism	Democratic control of economy	State control of key sectors	Limited for social good	Organized labor participation	Moderate, democratic reforms	Moderate
Fascism	Totalitarian state, nationalism	State capitalism under dictatorship	Severely limited	Mandatory participation in nationalist events	Technological but non-social	Low, internal conflicts
Anarchism	No central authority, self-regulation	Non-hierarchical economic structures	Maximum individual autonomy	Voluntary, decentralized	Fast, experimental	Low, absence of state
Technocracy	Experts make decisions	Scientifically designed economy	Limited; effectiveness prioritized	Limited; technical focus	Rapid in technical issues	High in technical fields
Theocracy	Religious leaders rule	Economy based on religious laws	Limited by religious doctrine	Limited to religious communities	Very slow, religious restrictions	High if aligned with religion
Absolute Monarchy	Unlimited royal power	Economy controlled by monarch	Minimal, concentrated	No participation	Dependent on monarch	High if stable
Constitutional Monarchy	Monarch with constitutional limits	Mixed economy	Protected, but limited by constitution	Through constitutional processes	Moderate	High with constitutional limits
Authoritarianism	Concentrated, limited freedoms	State-controlled economy	Very limited	Limited, controlled participation	Slow, regime-driven	Moderate, regime dependent
Totalitarianism	Total state control	State-controlled economy	Non-existent individual rights	No participation	Very slow, regime driven	Very low, oppressive
Oligarchy	Power held by a small elite	Elite-controlled economy	Limited for the majority	Limited to elites	Slow, elite-driven	Low, elite control
Ptolemaic Rule/ Plutocracy	Wealth-controlled nature	Economy driven by wealth	Limited for common citizens	Controlled by wealthy	Slow, wealth driven	Low