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Rational Agency and Uncertain Futures: AI's Role in the Gulf Region

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2. Abstract

This workshop explores how Artificial Intelligence is transforming rational agency—the ability of individuals, institutions, and societies to make coherent, goal-directed decisions—within environments shaped by complex and intersecting uncertainties. These uncertainties extend beyond incomplete information to include unpredictable technological advances, volatile global markets, environmental stresses, shifting socio-economic conditions, and geopolitical change.

The Gulf Cooperation Council (GCC) offers a distinctive and timely context for this inquiry. Rapid AI adoption is embedded in ambitious national development strategies, large-scale digital infrastructure investments, and accelerated economic diversification agendas. In this dynamic setting, AI is not only a tool for decision support but a force that reframes decision-making processes, reshapes strategic priorities, and influences governance structures.

Drawing on decision theory, probabilistic reasoning, reinforcement learning, and governance studies, the workshop will investigate how AI affects human and institutional rationality under uncertainty. Sessions will address uncertainty modeling, ethical and policy implications, and sector-specific case studies in energy, finance, healthcare, climate adaptation, and smart city planning. The aim is to bridge global theoretical debates with the Gulf's unique realities, producing insights and recommendations to ensure that AI's growing influence enhances resilience, transparency, and cultural alignment in an unpredictable future.

3. Context

Artificial Intelligence (AI) has moved from experimental innovation to a decisive force reshaping economies, governance, and social systems. In the Gulf Cooperation Council (GCC) states, AI is embedded in national development strategies such as Saudi Arabia's Vision 2030, the UAE's National AI Strategy 2031, and Qatar's Artificial Intelligence Strategy. These initiatives position AI not only as a technical advancement but as a transformative driver of economic diversification, public sector modernization, and strategic resilience (Albous, Al-Jayyousi, & Stephens, 2025).

The GCC's AI trajectory, however, unfolds amid severe, multi-dimensional uncertainty. As Andreoletti, Chiffi, and Taebi (2022) show, uncertainty may be factual, methodological, or normative, often resisting probabilistic modelling. This includes unpredictable technological advances (Nordström, 2022), volatile global markets, environmental pressures, and shifting socio-political expectations in youthful, highly connected societies. Chiffi and Pietarinen (2019) emphasise that decision-making in such contexts is shaped by both epistemic and non-epistemic values—critical where AI influences high-stakes governance.

Philosophical debates provide important policy insights. Roser (2017) questions the practical relevance of the risk–uncertainty distinction, advocating the use of subjective and epistemic probabilities even when imperfect. Kozyreva and Hertwig (2021) advance an ecological rationality view, showing when heuristics, rather than probabilities, are optimal. Ongaro (2025) highlights persistent disagreement-based uncertainties that complicate governance. Ethical analyses by Weatherson (2014), Zhao (2023), and Lee-Stronach (2021) examine how moral reasoning under uncertainty balances risk, value, and constraints, while Frank (2019) warns that ignoring “fat tail” catastrophic risks can violate scientists' duties—parallels that apply directly to AI safety.

In AI research, uncertainty is addressed via probabilistic inference, Dempster–Shafer theory, fuzzy logic, and other models (Saffiotti, 1987; Kanal & Lemmer, 2014). Zanotti,

Chiffi, and Schiaffonati (2023, 2024) adapt disaster risk analysis to AI, developing hazard–exposure–vulnerability frameworks for contexts where ex-ante and ex-post assessments are difficult. Langer and Valera (2023) add a human-centred perspective, showing that actionable explanations can improve user responses, though perceived actionability can have mixed effects.

Recent work on Artificial General Intelligence (AGI) expands this agenda, exploring its macroeconomic, political economy, and ethical implications. Studies model AGI’s effects on capital–labour substitution, sustainability, social contracts, and governance under volatility (Stiefenhofer, 2025; Stiefenhofer & Chen, 2024; Stiefenhofer, Deniz, Chen, Qian, & Almelthel, 2024; Stiefenhofer & Deniz, 2025; Giesl & Deniz, 2025), alongside technical analyses of stability, probabilistic modelling, and machine learning dynamics. The GCC context introduces distinctive variables:

- Economic diversification pressures – shifting from hydrocarbons to innovation-led growth (Al Bakri & Kisswani, 2024).
- Environmental and infrastructural constraints – water scarcity, climate vulnerability.
- Sector-specific imperatives – finance (Khan et al., 2022), education (Fadlelmula & Qadhi, 2024; Shamsuddinova et al., 2024), smart cities (Alexopoulos et al., 2024), healthcare (Sharfi, 2021), and corporate reporting (Khan, Ullah Jan, & Zia-ul-haq, 2024).
- Governance and cultural alignment – ensuring trust, ethics, and regulatory legitimacy.

This workshop addresses a critical gap: integrating global theoretical debates on AI, uncertainty, and rational agency with the GCC’s socio-economic realities. It will:

1. Analyse how AI reshapes rational agency in contexts of profound uncertainty.
2. Develop strategies to align AI with resilience, transparency, and cultural coherence.
3. Propose governance models grounded in value-sensitive, multi-component risk assessment.

By combining philosophical rigour, technical insight, and regional specificity, the workshop aims to advance scholarly understanding and policy readiness—ensuring AI strengthens, rather than undermines, the decision-making capacities needed for navigating the Gulf’s uncertain future.

4. Workshop Focus/Objectives

This workshop will explore how Artificial Intelligence (AI) is transforming rational agency—the capacity of individuals, institutions, and states to make coherent, goal-directed decisions—within environments shaped by intersecting and evolving uncertainties. These uncertainties extend far beyond gaps in information, encompassing unpredictable technological advances, volatile global markets, climate and environmental stresses, rapid socio-economic shifts, and geopolitical volatility.

The Gulf Cooperation Council (GCC) provides a distinctive and urgent context for this inquiry. Member states are undergoing accelerated socio-economic transformation, driven by diversification away from hydrocarbons, large-scale digital infrastructure investments, and ambitious AI strategies embedded in national visions. In this setting, AI is not simply a tool to support decision-making; it actively reconfigures decision frameworks—reshaping how goals are defined, how risks and opportunities are evaluated, and how trade-offs are resolved.

Central Question

How does AI influence human and institutional rational agency under conditions of uncertainty, and how can its development in the GCC be guided to enhance resilience, foresight, and ethical governance?

Key Themes for Discussion

- AI and Decision-Making Under Uncertainty – How AI models, optimizes, or transforms decision processes when probabilities are uncertain, incomplete, or contested.
- Interplay of Technology, Culture, and Institutions – The ways AI-mediated decision systems interact with GCC governance traditions, strategic priorities, and societal values.
- Methodological Perspectives – Insights from decision theory, probabilistic reasoning, ecological rationality, and adaptive learning applied to AI.
- Ethics and Governance in Volatile Contexts – Frameworks for ensuring AI systems preserve transparency, trust, fairness, and cultural coherence.
- Sector-Specific Applications – Case studies from GCC economies, such as energy systems optimization, financial forecasting, healthcare innovation, and climate adaptation.

Workshop Objectives

1. Conceptual Analysis – Examine how AI changes the nature and practice of rational agency, drawing on philosophical accounts of uncertainty, cognitive science, and social theory, and identify implications for decision-making in unpredictable environments.
2. Regional Contextualization – Analyse GCC-specific drivers of uncertainty—ranging from resource scarcity and energy market volatility to demographic trends and technological adoption patterns—and their interaction with AI-mediated governance.
3. Applied Insights – Present and assess practical methods for modelling and managing uncertainty in AI applications, including multi-component risk frameworks, probabilistic and non-probabilistic approaches, and hybrid human-machine decision systems.
4. Ethics and Governance Alignment – Develop actionable recommendations for aligning AI deployment with ethical principles, explainability standards, and culturally grounded governance practices, while safeguarding human autonomy and agency.

By combining conceptual analysis with regionally grounded case studies, the workshop will produce insights that connect global debates on AI and uncertainty with the GCC's strategic realities. The ultimate objective is to equip policymakers, researchers, and practitioners with frameworks and tools to ensure that AI strengthens—not undermines—the decision-making capacities essential for navigating an uncertain future.

5. Paper Focus/Topics

We invite papers exploring the theoretical, empirical, and policy dimensions of AI's impact on rational agency under uncertainty, with a focus on the Gulf region. Topics may include, but are not limited to:

- AI and Rational Agency – how AI reshapes human and institutional decision-making, goal formation, and strategic reasoning in uncertain environments.
- Uncertainty in Technological, Economic, and Political Contexts – approaches to managing unpredictability in AI development, global markets, climate, and geopolitics.
- Foundations and Methods – decision theory, game theory, Bayesian inference reinforcement learning, and adaptive systems relevant to uncertain conditions.
- Regional Applications and Case Studies – energy transition, water and food security, climate adaptation, healthcare, finance, logistics, and smart city governance in GCC countries, Iraq, Iran, and Yemen.
- Cultural and Governance Factors – embedding AI within local norms, legal systems, and decision-making traditions.
- Ethics, Trust, and Accountability – safeguarding human agency, ensuring explainability, and building trust in AI-mediated decisions.
- Foresight and Resilience – scenario planning, anticipatory governance, and strategies for robust long-term decision-making.

We welcome interdisciplinary contributions bridging computer science, Gulf studies, social sciences, philosophy, and public policy. Submissions should aim to generate both scholarly insight and actionable recommendations for policymakers, industry leaders, and civil society in the Gulf.

6. Publication Plans

The joint publication will take the form of a special issue the Journal of Philosophy of Management and/or Journal of Philosophy of Economics. It will consolidate the workshop's most significant contributions, advancing scholarly understanding of how AI shapes rational agency under conditions of uncertainty, with specific application to the Gulf region.

Provisional Table of Contents:

1. Introduction – AI, Rational Agency, and Uncertainty in the Gulf Context.

2. Theoretical Foundations – decision theory, game theory, Bayesian reasoning, and adaptive systems.
 3. Technological Uncertainty and AI – impacts of evolving AI capabilities on decision-making.
 4. Managing Complex Risks – probabilistic reasoning, scenario planning, and resilience-building.
 5. Sectoral Perspectives – energy transition, climate adaptation, healthcare, finance, and urban governance in the GCC.
 6. Cultural and Governance Dimensions – aligning AI’s influence with Gulf values, norms, and legal systems.
 7. Human–AI Interaction – preserving human judgment, trust, and accountability under uncertainty.
 8. Futures and Strategic Foresight – anticipatory governance for long-term AI strategy.
 9. Conclusion – policy and research recommendations for AI, rationality, and resilience in the Gulf.
- This publication will bridge philosophy, AI research, and Gulf studies, providing a rigorous interdisciplinary reference for academics, policymakers, and practitioners.

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8. Workshop Directors

Dr. Pascal Stiefenhofer holds doctorates in both Mathematics (PhD) and Economics (PhD) and is an interdisciplinary researcher whose work spans artificial intelligence (AI), economics, political economy, philosophy, and decision sciences. His research focuses on how AI—particularly Artificial General Intelligence (AGI)—interacts with economic systems, governance structures, and decision-making under uncertainty. Combining theoretical modelling with applied analysis, he examines the transformative impacts of emerging technologies on capital–labour dynamics, social contracts, sustainability transitions, and long-term economic resilience.

He is currently Senior Lecturer at Newcastle University, where he serves as PhD Convenor and Director of Studies, and acts as an advisor to the UK Office for Students, assessing higher education institutions on degree-awarding powers. He supervises doctoral research on Gulf Cooperation Council (GCC) economics, with particular focus on economic diversification, digital transformation, and the integration of AI into strategic development plans. His academic career includes appointments at the University of Exeter, University College London, the University of Sussex, and the University of York. Beyond teaching and administration, Dr. Stiefenhofer contributes to global scholarship as Editorial Board Member of the *Journal of Philosophy of Management* and Associate Director of the *Journal of Philosophy of Economics*. His recent work explores macroeconomic and political economy models of AGI adoption, the resilience of AI-driven systems, and the ethical and governance implications of emerging technologies in volatile socio-economic contexts.

Dr. Ali Yavuz Polat is Associate Professor of Economics and Finance at the Gulf University of Science and Technology (GUST), Kuwait, where he also serves on the Steering Committee of the Center for Sustainable Development. He holds a PhD in Financial Economics from the University of Leicester, and master's degrees in Economics from Johns Hopkins University and Boğaziçi University. His research lies at the intersection of financial economics, uncertainty, and sustainability, with applications to the GCC region, fintech, energy markets, and corporate finance.

Dr. Polat has published extensively in peer-reviewed outlets such as the *Journal of Economic Studies*, *Financial Innovation*, *Scottish Journal of Political Economy*, and *Borsa Istanbul Review*. He has led and collaborated on major funded projects, including

TÜBİTAK-supported studies on COVID-19's economic effects and climate policy uncertainty in financial markets. As Principal Investigator, he is currently directing a project on climate risks and MENA financial markets. He is a frequent speaker at international forums, including the Asia Cooperation Dialogue Ministerial Meeting and Derasat Forum in Bahrain, addressing global challenges to green recovery and climate policy.