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The Triple Transition and the Dawn of Quantum Policymaking

As we enter a new year, it is crucial to reflect on the challenges of the past and reconsider the foundations of economic and public policy. The past year has raised significant doubts for economists and policymakers, prompting the need to rethink their approaches to effective policymaking – precisely the mission of think tanks and policy journals.

The role of scholars and policymakers has shifted dramatically over the last five years. When the European Green Deal launched in 2019, the prevailing approach adhered to the Tinbergen principle – that we could focus on one major policy goal without having to consider other objectives while working towards it. Decarbonisation, for example, was treated as an independent objective, with less focus on potential trade-offs. However, the reality of modern policymaking is far more complex. Trade-offs are now an unavoidable and immediate concern for policymakers, making it essential to move beyond simplistic, goal-driven frameworks.

From linear policymaking to quantum policymaking

Traditional economic policymaking has long been guided by principles such as cost-benefit analysis, GDP growth and market failure correction. While these methods have shaped regulatory approaches worldwide, they often fail to account for distributional and territorial impacts. Economists have typically monetised costs and benefits, calculated net present values and selected policy options based on maximised efficiency. However, this narrow focus is increasingly insufficient in an era of unpredictable macroeconomic shocks and global governance complexities.

One major limitation of traditional policymaking is its reliance on a single future projection – extrapolating the present into the future without accounting for potential disruptions. Policies are often designed for long-term implementation without adequate mechanisms for adaptability. Additionally, EU policymaking has traditionally taken a broad, union-wide perspective, often overlooking the specific territorial impacts of regulations. While recent impact assessments have acknowledged these concerns, many legacy approaches persist within the European Commission.

The preference for cost-benefit analysis remains strong, largely because it provides a controlled and quantifiable framework for decision-making. However, alternative approaches, such as multi-criteria analysis, offer more nuanced and adaptive strategies for evaluating policy decisions. Over time, shifting paradigms have recognised the increasing complexity of economic reality. A singular focus on GDP growth or economic efficiency no longer suffices as the sole objective of policymaking.

The global policy landscape has already begun to evolve. Many countries have adapted the regulatory impact analysis model, originally developed under the Reagan Administration, to fit their national contexts. This gradual shift signals a broader recognition that economic policymaking must go beyond rigid efficiency models and incorporate more comprehensive, adaptable frameworks. The challenge ahead lies in integrating these new approaches into mainstream policy discussions, ensuring that economic decision-making reflects the multifaceted realities of governance in a rapidly changing world.

The implementation of regulation as a blueprint for public policy has expanded globally, influencing legislative processes in parliaments and congresses. At the EU level, cost-benefit analysis – originally designed for federal regulation in the United States – was applied to directives such as the Bolkestein Directive and asylum-related legislation. From the early 2000s to around 2015-16, there was a clear methodological mismatch, as tools were used in contexts for which they were not designed.

Goals-based strategies

A major shift in public policy theory has been the shift from purely expanding economic growth, as per the Washington Consensus, to a goal-based strategy. Previ-

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ously, the focus was on reducing costs and driving GDP growth through domestic markets, institutions, technology and innovation. However, the Millennium Development Goals and later the Sustainable Development Goals (SDGs) underscored the need for broader objectives beyond growth alone.

Despite this, the current rhetoric still largely reflects Washington Consensus principles. The 2023 State of the Union speech by Ursula von der Leyen, for instance, focused on cost minimisation and growth, with limited mention of decarbonisation. This reflects a broader uncertainty about the direction of policy.

The shift towards goal-based policymaking aims to create a clear vision, followed by specific actions to achieve it. The EU has attempted this approach, albeit inconsistently. The Lisbon Strategy, launched with the ambitious goal of making Europe the most competitive knowledge-based economy, was later revised pragmatically to focus on growth and jobs. The Europe 2020 strategy faced challenges due to financial and sovereign debt crises, leading to its gradual decline. In 2015, the SDGs provided a new framework, followed in 2019 by initiatives such as the Green Deal and Digital Decade.

However, setting broad policy goals without accounting for evolving realities can be problematic. The SDGs were intended to be integrated and indivisible, yet EU policies like the Green Deal have selectively prioritised certain elements while neglecting others, such as strong institutions, territorial and social impacts, and human capital. This selective approach creates gaps in the broader vision of sustainable development.

As policymakers now work to redefine medium-term goals, competitiveness has emerged as a potential central focus. However, questions remain: Can competitiveness be reconciled with multiple policy objectives? Should it be the sole priority? As of December 2024, there is no clear consensus among policymakers and scholars.

Navigating uncertainty: Rethinking policymaking to prepare for future shocks and crises

Anticipating future shocks is crucial for effective policymaking, yet this consideration remains absent from traditional paradigms. In an era that some optimists call a "polycrisis" and pessimists term a "permacrisis," policymakers must adapt to uncertainty rather than rely on rigid long-term plans. The challenge ahead lies in developing policy frameworks that remain flexible and responsive to an unpredictable global landscape.

In the face of unpredictable shocks, policymakers must consider the cascading effects that could follow, even if these outcomes are difficult to foresee. A core practice in foresight is imagining various potential futures and the consequences of such events, which may range from catastrophic to more manageable scenarios. One pressing question is whether to prioritise preparation for the worst-case scenarios, despite their lower likelihood, in order to reduce risk and safeguard against potential disasters.

For instance, Cass Sunstein, a prominent figure in cost-benefit analysis and former regulatory czar under the Obama administration, has proposed a strategy to avoiding disastrous scenarios. In his book *Averting Catastrophe*, Sunstein (2021) argues for adoption of a "maximin" approach, which focuses on protecting against the most severe outcomes, even if their probability is low. This approach contrasts with traditional cost-benefit analysis, which typically weighs risks according to their likelihood. In policymaking, we may need to move beyond a single "baseline" future and instead consider alternative scenarios. A policy option that works best in the most likely future may perform poorly if unexpected shocks occur. Therefore, a second-best policy, which is less optimal in a linear scenario but better suited to alternative futures, might prove more robust in the long term.

Experts in risk analysis suggest that we are entering an era where shocks – whether environmental, digital or geopolitical – are becoming more frequent and interconnected. The notion of a single, isolated crisis is being replaced by a new normal in which multiple crises occur simultaneously, such as conflicts stretching from the Middle East and Syria to Ukraine. Just over a year ago, we could not have predicted the level of instability we now face, making long-term forecasting even more challenging. In planning for 2028, for instance, many expected stability, yet in retrospect, the past few years have been marked by unpredictable events, including pandemics and geopolitical upheaval.

The unpredictability of the future is further emphasised in the realm of technological innovation. Consider the rapid evolution of artificial intelligence (AI); when the European Commission first worked on the AI Act in 2020, the landscape was vastly different, with no mention of advanced models like GPT. By the time the legislation was finalised in 2023, new technological advancements had already reshaped the conversation. The full implications of AI developments by 2026 remain uncertain, highlighting the challenges of crafting legislation that can keep pace with rapid change. While some regula-

tory bodies, such as the European Medicines Agency, have demonstrated an ability to adapt, this flexibility is not widespread across the Commission.

Which "North Star"?

Ultimately, the future is inherently unpredictable, and relying on linear extrapolation of the present is a flawed strategy. Policymakers must account for a range of potential futures and be prepared for surprises, embracing adaptive approaches that allow for flexibility and resilience in the face of uncertainty.

Over the course of the von der Leyen Commission, I decided to track how often the European Commission changed its strategic direction. I focused on official documents, such as the industrial policy review from May 2021, which revealed two different definitions of key concepts within the same document (European Commission, 2021). This highlights the shifting priorities within the Commission, which began with a focus on strategic autonomy and resilience, particularly during the pandemic. With the onset of the war in Ukraine, the focus shifted towards economic and comprehensive security.

Originally, the Commission framed its efforts within the context of sustainable development, addressing it across multiple policy areas such as regulation, industrial policy and foreign affairs. However, despite these ambitions, none of these objectives have been fully realised. More recently, discussions have centred around the green, digital and social transitions, but the dominant focus remains on stripping the term "competitiveness" of its qualifications, such as "sustainable competitiveness" or "competitive sustainability".

In discussions with several experts, I asked whether the concept of competitiveness in the EU includes resilience or sustainability. Despite widespread interest in decarbonisation as a crucial aspect of future competitiveness, the Commission has not made significant progress on this front. The ultimate goal, I believe, should be focused on well-being – specifically people, planet and prosperity – as outlined in EU treaties, with these being intermediate goals subject to change over time.

In policymaking, we often encounter what is referred to as a "trilemma". One key example is the challenge of achieving competitiveness alongside decarbonisation and economic security. As economist Dani Rodrik (2000) suggests, it may be possible to achieve two of these goals, but not all three simultaneously. Mario Draghi's (2024) response was to propose a hefty budget – €800 billion annually – to potentially make this work. However, such resources are unlikely to be available given the pressing need to allocate funds to other priorities, especially in the age of Trump 2.0.

As we look ahead, a different policy mix will likely emerge at the EU level. In summary, the key challenges we face are evident. First, we have not yet learned to prepare for future shocks, nor have we built adaptive policies. The focus on SDGs has led to fragmentation, as seen with the replacement of the Green Deal with the Clean Industrial Plan, which has not fully delivered on its promise. Additionally, there has been an overemphasis on innovation as an end in itself, rather than innovation that aligns with our ultimate goals.

Moreover, the frequent shifting of strategic priorities makes it difficult to maintain a clear direction. In a metaphorical sense, changing course every 15 minutes is like navigating without a consistent North Star. The Commission has also failed to address the distributional and territorial impacts of its policies, something that many now recognise as a mistake.

As we enter an era where economic decisions are increasingly complex, the assumption of simple, linear choices no longer holds. Economics, as traditionally understood, assumes that individuals' well-being is independent of others, but in reality, well-being is interdependent. This shift in thinking, rooted in the works of economists like Joseph Schumpeter and Friedrich Hayek, signals a need for a more nuanced approach to public policy. The coming years will demand more flexible and adaptable strategies, as the old models of economics and policymaking no longer suffice.

Economics is the only social science that fails to directly integrate the social element into its methodology. In practice, policy impacts are far more complex than often assumed. Each community or territory responds to rules and policies in different ways, influenced by local governance and community organisation. This became evident during the COVID-19 pandemic, where similar restrictions had vastly different effects depending on how they were implemented at the local level.

Rethinking policy monitoring: Towards quantum policymaking

Understanding these varying impacts requires continuous monitoring. To ensure policies are achieving their intended outcomes, the European Commission includes evaluation sections in its policies. However, there is a need for a more serious, granular approach to policy

monitoring, ensuring that data is produced and used effectively to enable policy learning.

This is where "quantum policymaking" comes into play. In much the same way that quantum physics explores entanglement and superposition, policy impacts are entangled and require constant observation. Policies cannot be understood in isolation; they need to be monitored over time to assess whether they are delivering the desired results.

In terms of policymaking, the EU must transition to goal-based frameworks. While the 2030 agenda is still ongoing, there is little discussion about what comes next. The SDGs were finalised ten years ago, but it remains unclear what the 2040 agenda might look like. Although the 2030 agenda is not yet fulfilled, the focus must shift towards well-being as the North Star, with intermediate goals aligned to this vision. These goals must be constantly monitored and adjusted if necessary, acknowledging that policy impacts are dynamic and interdependent.

The shift towards goal-based policymaking contrasts with the traditional focus on market failures. Rather than waiting for markets to fail, we need to proactively pursue legislative goals, guided by multi-criteria analysis and trade-off assessments. While cost-benefit analysis is still useful for certain regulatory acts, it is not suitable for goal-based policymaking, where criteria and goals should align.

The traditional Tinbergen principle no longer applies. Instead, modern policymaking deals with multiple trade-offs, alternative futures and the need for agile, dynamic and multi-stage approaches. The focus should be on place-based innovation and policy-centred governance, considering the unique needs and circumstances of different regions.

Take, for instance, industrial policy. The concept of Industry 4.0, which has been central to European policy discussions for years, focuses on digital technologies in factories and supply chains. However, it often overlooks the social and environmental dimensions. A shift towards Industry 5.0, which emphasises human-centred, sustainable and resilient industrial transformation, is necessary. This approach not only considers technological advances but also prioritises jobs, the environment and broader societal impacts.

The traditional approach to industrial transformation often overlooks crucial factors like environmental impact, governance and territorial concerns. As we deepen the integration of digital technologies in industries, it is no longer acceptable to consider these as afterthoughts. Our policymaking must fully account for the trade-offs involved in industrial change, ensuring that sustainability and societal impacts are central to the process.

For nearly a decade, expert groups within the European Commission, particularly the expert group on the economic and societal impact of research and innovation (ESIR) in DG Research and Innovation, have been producing papers on the economic and societal impacts of research.[1] These discussions have led to a broader understanding of competitiveness – one that includes resource and material efficiency and stays within planetary boundaries. This view has gained attention, particularly within the European Commission and the Council, as a more comprehensive way of thinking about competitiveness. It aims not just at economic growth but at well-being-related outcomes, aligning with the EU's treaty-based goals.

To support this shift, new indicators are being developed to measure competitive sustainability, with contributions from institutions like Cambridge (Cambridge Institute for Sustainability Leadership, 2024) and the Joint Research Centre (Benczur et al., 2025). The goal is to establish a more multidimensional view of competitiveness, one that prioritises well-being rather than narrow economic indicators like income. This perspective draws on the utilitarian foundations of economics, which originally focused on well-being but have since been skewed towards income as a proxy – a choice that has been contentious.

A further example of this shift is the concept of mission-oriented policymaking. This approach, gaining traction in the UK under the Starmer government, focuses on setting broad, sectoral goals. In the field of AI, for example, the EU has defined criteria for "trustworthy AI", which includes respect for fundamental rights and orientation towards societal and environmental well-being.

The challenge, however, is that many AI systems today, including GPT models, do not meet these criteria. To ensure AI development aligns with societal goals, policymakers must incorporate these trade-offs into both design and regulation.

1 https://research-and-innovation.ec.europa.eu/strategy/support-policy-making/shaping-eu-research-and-innovation-policy/esir_en#documents.

The territorial dimension of polices

Finally, the territorial dimension of policy is becoming increasingly important. Research on the geography of discontent, led by figures like Andrés Rodríguez-Pose, explores how different regions across the EU can achieve innovation and competitiveness based on their unique capabilities. This reimagining of innovation policy focuses on the specialisation of each region, considering its potential for well-being alongside economic development.

As technologies become more sophisticated, their production tends to concentrate in geographical hubs. For emerging fields like quantum computing, success depends on a combination of infrastructure, skills and well-developed financial markets. Addressing these regional disparities is critical to ensuring that innovation benefits all areas of society, not just the hubs where advanced technologies are concentrated.

In Europe, the development of advanced technologies, particularly AI, has become increasingly geographically concentrated. Four main hubs – London, Paris, Eindhoven and Munich – dominate the AI landscape, with London leading by far. However, these hubs do not collaborate as closely as they should. Instead, they often look to American institutions rather than working together within Europe. One promising exception is the emerging partnership between Belgium and the Netherlands, which could potentially create a future European Silicon Valley, driven by companies like imec and ASML. However, policymakers have not yet fully realised the potential of these collaborations, as evidenced by the limited funding support from the European Commission and national governments for key industrial players like imec.

This geographic concentration also has political implications. For example, in the last French election, areas that voted for far-right parties largely corresponded with regions outside these technological hubs, underscoring the political discontent in regions outside the main urban centres. These patterns reflect the fact that large portions of the economy and territory have been overlooked by policymakers, leading to protests from groups like truck drivers and farmers who feel excluded from the formulation of policies.

This issue is particularly evident when we model climate and environmental policies. Such models must go beyond basic environmental impact assessments and consider territorial and distributional effects. They must also align with Europe's technological frontier. The challenge today is to balance these multifaceted goals, which is something scholars, researchers and policymakers need to support in order to address the complexities of modern industrial policy.

Redefining competitiveness: A long-term vision for sustainable and inclusive growth

The long-term goals of public policy are not merely about competitiveness, a point emphasised in economic theory and public policy manuals. Rather, competitiveness should be seen as an intermediate goal that leads to broader objectives, such as the preservation of various forms of capital, including environmental and social capital. Some countries, like New Zealand and Sweden, have already defined such long-term goals with specific indicators. In the EU, there is growing interest in extending the time frame for policy evaluation, moving beyond short political cycles to consider a couple of decades. This would allow for more robust and sustained policy development.

Once these long-term goals are set, the EU can backcast to shape its agenda, creating industrial transformation pathways. These pathways will need to be flexible, ready to adapt as realities change. As Europe works towards these goals, it must prepare for future shocks and ensure that policies can be adjusted when necessary.

Mission-oriented innovation will play a key role in this process. The EU must blend its competitiveness fund and other resources to support large-scale projects with clear societal and economic objectives. This approach requires careful planning, including stress testing and regular updates to situational awareness. While this framework is straightforward in theory, its practical implementation will be challenging, as it requires aligning multiple instruments towards common goals – a task that has not always been achieved.

Looking ahead, Europe can learn from recent developments in the US, such as the Inflation Reduction Act, which incorporates employment-related conditionalities alongside environmental goals. This legislation has set a precedent for integrating social objectives into industrial policy, something that the EU should consider as it moves forward.

Finally, understanding the economic geography of Europe will be crucial. Not every region can be expected to become a technological hub like California, and policies must recognise the unique capabilities of each territory. The concept of regional innovation engines,

similar to the US approach, could help foster development in all parts of Europe, rather than concentrating innovation in a few select areas. This approach would take into account the legacy and specialisation of different regions, enabling each to contribute to Europe's broader goals.

In conclusion, Europe must embrace a more proactive and coordinated approach to industrial policy, balancing competitiveness with well-being and sustainability. By learning from both successes and failures, the EU can avoid the pitfalls of replicating models that may not be suitable for the given context. Economic theory and public policy must rise to meet the challenge, ensuring that Europe remains competitive while securing a sustainable and inclusive future.

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