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Article

Governing Trade-Offs and Building Coherence in Policy-Making for the 2030 Agenda

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Abstract
This article introduces a suggested comprehensive framework for identifying, assessing and governing trade-offs and enhancing coherence in public policy decision-making. The framework is based on a simple three-stage model of policy-making: understanding policy interactions (input), integrating policy-making (process), and assessing *ex ante* policy decisions (output). The first stage is tackled with an interactions assessment framework, identifying how different sectors or ministries relate to each other in terms of their respective objectives, and on what topics negotiations are required to manage trade-offs. The second stage draws on approaches and experiences in environmental policy integration. It focuses on institutional procedures, structures and rules that enable integrated policy-making processes. The third stage draws on the longer-standing policy-analytical field of impact assessment applied to sustainable development. The article discusses the conceptual and theoretical foundations of each stage, as well as practical policy experiences. Discussing this in the context of 2030 Agenda implementation, the article suggests how trade-offs and policy coherence can be better governed using adapted policy-analytic methods and approaches.

Keywords
2030 agenda; cross-impact analysis; decision-making; environmental policy integration; impact assessment; policy analysis; policy coherence; sustainable development goals

Issue
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1. Introduction

When the 2030 Agenda for Sustainable Development was adopted by the United Nations General Assembly in September 2015, it signified a new level of international political agreement regarding the interdependency between economic and social development and environmental sustainability. It is true that the Millennium Development Goals included an environmental goal, and that the earlier Rio Declaration on Environment and Development articulated the three pillars of sustainable development. What was new in 2015 was, first, that the environmental, social, economic and institutional dimensions of development were so intertwined; for example, the food security goal (Sustainable Development Goal [SDG] 2) mainstreamed all three dimensions across its targets. Second, the 2030 Agenda forcefully emphasized that the goals framework is "integrated and indivisible" and that "the interlinkages and integrated nature of the Sustainable Development Goals are of crucial importance" to its implementation (UN, 2015).

What exactly these interlinkages are differ in different contexts, but they exist along several dimensions: between economic, social and environmental interests;

between different sectoral interests; between domestic and international objectives; and between short-and long-term priorities (for empirical examples of trade-offs pertaining to SDG implementation see e.g., Hutton et al., 2018; Pradhan, Costa, Rybski, Lucht, & Kropp, 2017; Scherer et al., 2018). For national implementation this means that synergies and trade-offs between targets that address different policy areas must be captured or reconciled at the domestic level, reconciled with internationally agreed objectives, and any negative spillovers on other countries addressed (Nilsson, Griggs, & Visbeck, 2016; Organisation for Economic Co-operation and Development [OECD], 2018; Weitz, Carlsen, Nilsson, & Skånberg, 2018).

Although dealing with trade-offs and promoting integrated policy-making have been long-standing agenda items in public policy and management, at least since the 1980s, the establishment of the 2030 Agenda—with its wide scope and principles of universality, integration and transformative change—marked a whole new level of ambition. Progress on the SDGs requires cross-sectoral, cross-scale and long-term policy approaches. However, the international and national public policy agencies mandated to deliver such integrated approaches have struggled to do so in practice, and while enhancing policy coherence is one of the targets of the 2030 Agenda, many countries have said that this is one of the most difficult challenges in implementation (Koch, 2017; OECD, 2018).

As any political declaration would, the 2030 Agenda put focus on the positive interactions: The synergies and co-benefits that can be harnessed when one development achievement triggers or contributes to another. It is noteworthy that most official public policy tends, for political reasons, to avoid acknowledging trade-offs altogether. At the global level, the 2030 Agenda makes references to "win–win cooperation" but not to trade-offs or conflicts between goals (UN, 2015). At the EU level, for example, synergies between energy and climate policies, as well as between different environmental policy objectives, are often taken for granted, while underlying trade-offs and goal conflicts are hidden from the discourse or ignored. On the other hand, the realities of policy-making have always been more about the other side of the "integration" coin: the many trade-offs and conflicts between policy priorities in different areas. Managing these trade-offs and conflicts, and finding paths to progress, are to a great extent the heart of political decision-making.

This article aims to unpack the mechanisms available for political decision-makers to manage trade-offs, from the input stage of policy-making, through the process, to ensuring that adopted public policies are as coherent as possible. The purpose is to discuss available mechanisms in the context of the 2030 Agenda, but it is not to provide an empirical study of how trade-offs are dealt with in 2030 Agenda implementation. Our view is that such a study would be premature and there is not yet enough experience and data across jurisdictions.

Managing trade-offs in policy-making is not limited to the novel field of 2030 Agenda implementation. In practice it has been a key part of the concept of policy coherence for development pushed by the OECD for more than a decade (OECD, 2018; OECD/Development Assistance Committee, 2008). More "joined-up" government was a top priority in the UK government in the 1990s, and around that time also became an important agenda item in the EU, which has since actively contributed to the concept of policy coherence (Carbone, 2013; Ling, 2002). In the EU, the impact assessment instrument became a primary mechanism for identifying and mitigating trade-offs when European directives are being prepared. But, the 2030 Agenda establishes a new level of complexity, a significant widening of the challenge of dealing with trade-offs and expectations to establish a policy-making system that can deliver coherent decisions.

In this article we connect this challenge to the question of how best to organize decision-making in public policy when it comes to complex problems. This field of policy analysis and research has been occupied in particular with the question of how to foster participation and engagement in, as well as technical expert input to, the policy process, in order to make decisions both more democratic and legitimate, and more effective in terms of problem solving (Stern & Fineberg, 2003). It is a well-established question in the policy sciences how to balance or combine these different processes and inputs, through what has been called an "analytical-deliberative process of decision making" (Renn, 1999). We postulate that technical expertise is necessary but not sufficient for dealing prudently with trade-offs in policy-making. As part of pluralist societies, we must also account for the diverse values, world views and legitimate interests of different stakeholders. These will influence how issues and knowledge are interpreted and used in political processes.

The perspective taken here on policy coherence is that the knowledge, entry points (e.g., ideological, cultural) and information base available to decision-makers is pertinent to governing trade-offs in a legitimate and effective way. In any representative political system, this is what will be drawn on to motivate a decision—internally as standpoints are negotiated within government, and externally as government relates to the preference of those who are affected by the decision and the actions that follow.

Since the late 1990s there has been a push to enhance the scientific input to policy, making it more evidence-based. Many barriers persist, on the supply as well as the demand sides, including mismatched timelines, lack of consensus on research findings, failure to communicate research in an understandable way, and challenges to effectively engaging researchers in the policy process. Pragmatic approaches are needed that balance the requirements of policy-makers with the imperative of scientific rigour, in order to address these barriers and make the connection between science and pol-

icy credible, relevant and legitimate (Gavine et al., 2018; Sarkki et al., 2014). As Gro Harlem Brundtland put it, "politics that disregard science and knowledge will not stand the test of time" (Brundtland, 1997).

Another push has been for deepening participation in political decision-making processes and institutions that are genuinely deliberative (Pogrebinschi & Ryan, 2018). In practice this might make e.g., public hearings, consultations, seminars and online portals for public debate more common as a source of input to policy-making. These institutions must also be representative enough. This is important in relation to the 2030 Agenda, given its emphasis on inclusiveness with regard both to the adoption of the Agenda (which was the result of over two years of public consultation; UN, 2015) and to its guiding principles of "leaving no one behind" and universality. It is also, more generally and normatively, important in a world of increasing mistrust in public institutions—although more research is needed into the circumstances under which increased participation actually improves development outcomes and enhances the legitimacy of and trust in decisions.

2. Approach

This article is only of limited empirical value, but instead takes a policy-prescriptive approach to the governance of trade-offs. As argued above, we take as a starting point that governing trade-offs will require an analytic-deliberative approach to policy-making, where both participatory elements and technical expertise are required at different stages.

In this, we use a policy-analytic model based on simple input-process-output stage logic (Dunn, 2004). In reality, the public policy process is far from linear, and is a much more dynamic, chaotic and porous process involving diverse actors, interests, ideas, institutions and constantly perturbed by short-term disruptions or shocks as well as changes in slower-moving variables. However, a more realistic representation of actual policy-making—deploying, say, the Advocacy Coalition Framework (Sabatier & Jenkins-Smith, 1993), new institutionalism (March & Olsen, 1983) or the policy streams/garbage can model (Kingdon, 1984)—would risk limiting the prescriptive value of the study, since the solutions would be so strongly tied to a particular theoretical lens on the process. We use this over-simplistic model in order to provide clarity and focus on the solutions and prescriptions offered.

The approach taken is to first identify the problem in terms of trade-off governance in each stage, then to describe the mechanisms available for decision-makers to tackle this problem, and finally to describe how the mechanisms have been applied in practice.

A comprehensive approach to achieve policy coherence should start with a problem definition (Kurze & Lenschow, 2018; Nilsson et al., 2012). Therefore, a mapping of interactions between different objectives forms a necessary step at the input stage (Nilsson et al., 2016; Weitz et al., 2018). The input stage involves the entry points and knowledge base that goes into the policy-making process, including the preunderstanding of the societal context that actors in the policy-making have, and the information that they can draw on to enhance this understanding. An interactions assessment framework helps to define the problem by allowing different sectors or departments in government to come together and jointly identify how they relate to each other in terms of their respective priorities, and on what topics negotiations are required to manage trade-offs.

The second process stage involves the procedures and rules of decision-making that constitute the core of the policy-making in the government offices. This is for example features of the organizational set-up, standard operating procedures as well as additional measures taken to amplify or induce more integrated perspectives in the process. This stage is informed by adapting institutional lessons drawn from environmental policy integration.

The output stage involves the mechanisms available for policy-makers, and other actors, to look ahead at the resulting impacts, not only on the target policy domain but across all relevant domains, should the policy decisions be implemented. This stage is informed by adapting different forms of impact assessment and foresight methods.

Each of the three stages is discussed below in terms of:

1. How the policy literature and policy applications have dealt with the question of coherence and trade-offs in that particular stage in recent years or decades;
2. In what ways the 2030 Agenda provides a new challenge and set of implications for the governance of trade-offs in that particular stage;
3. Our outline of a potential approach to tackle this new and reinforced challenge of governing trade-offs in the era of the 2030 Agenda.

3. Addressing Trade-Offs and Building Coherence in Policy Inputs

A basic principle for governance to be effective in achieving the intended results of the 2030 Agenda is that public policies should be "coherent with one another and founded on true or well-established grounds" (UN Economic and Social Council & Center for European Policy Analysis, 2018). Without a solid knowledge base that considers how different objectives or sectors interact, policies risk continuing to reinforce unsustainable patterns of interaction. The 2030 Agenda is meant to break such patterns. For example, achieving both SDG 8 and SDG 15 (and several other goals that interact with them) requires decoupling economic growth from environmental degradation. While these interac-

tions existed before the UN member states agreed on the 2030 Agenda, the declaration marks an elevated ambition to clarify them at global, national and sub-national levels and for policy and actions to respond to them. As stated in paragraph 18 of the declaration, "never before have world leaders pledged common action and endeavour across such a broad and universal policy agenda" (UN, 2015). Attaining the SDGs will largely depend on whether policy can tackle trade-offs and leverage synergies within this broad agenda (Pradhan et al., 2017). For the input stage of policy-making this implies a need for approaches that can single out actionable information among complex interdependencies within and between economical, political, social and technological systems.

While the need for policy integration and coherence has been recognized for decades, progress in practice has been limited. One reason is a technocratic approach assuming that once information on cross-sectoral interactions is available, policy can swiftly be adjusted to resolve or optimize them. The academic literature related to policy coherence and integration, however, suggests that political and cognitive factors such as trust, ownership and learning are essential in order for inputs on policy interactions to make a difference in actual decision-making (Weitz, Strambo, Kemp-Benedict, & Nilsson, 2017). Decision-makers' understanding of relations and interactions shapes their views on what challenges and opportunities trade-offs and co-benefits pose, and what policy options there are for mitigating or capturing them. Policies thus result from a weighting of different options that are derived from institutions' value systems and the perceptions of decision-makers (Nilsson, 2005; Persson, 2007). Tackling trade-offs from the input stage is largely about working with these perceptions and understandings. With policy changes following from changes to the way decision-makers understand and perceive of different phenomena, strengthening the information basis and knowledge about interactions at the input stage becomes crucial for policy to more effectively govern trade-offs.

Information about policy interactions is often scattered and fragmented, and views on their implications diverge (Bosch, King, Herbohn, Russell, & Smith, 2007). In the context of the 2030 Agenda this is particularly challenging given the large number of interacting targets and their often complex relationships. The Delphi method is one of the most frequently used by decision-makers to aggregate large amounts of information and support consensus. It emerged in the 1950s and is used in foresight exercises to generate scenarios (Bañuls & Turoff, 2011), which is a widely used tool in long-term planning (Weimer-Jehle, 2006). Though systematic and interactive, the Delphi method in its original form does not account for how the different events that comprise a scenario influence each other, and it therefore does not provide decision-makers with the systemic thinking needed to support policy coherence.

In the context of the 2030 Agenda, systemic thinking means taking a holistic view to explore how all the targets work together and what the emergent effects of their interaction are, and understanding what this means for goal attainment in different geographies and for different groups of people. As an approach, Systems Thinking has shifted its focus since it first emerged in the 1950s, away from goal seeking and towards learning (Bañuls & Turoff, 2011). Reflecting this, Quade (1969) concluded, in the context of future studies, that a systemic approach is useful to governments if it is integrated into the policy-making process. Such integration would facilitate proper consideration of results and the learning needed for policy change to happen.

Cross-impact analysis emerged in response to the lack of systemic thinking in future studies—and the Delphi method in particular. Exploring whether the occurrence of an event changes the probability of other events occurring, it sought to reduce uncertainty about the future by analysing multidisciplinary interactions (Gordon & Hayward, 1968). Given the complex environments that decision-makers face—multiple objectives, long time horizons, a large number of diverse impacted groups, and risk and uncertainty, to name just a few—cross-impact analysis is not intended to identify "optimal solutions," just to generate insights that help decision-makers reach better decisions (Keeney, 1982).

The first step in cross-impact analysis is to define the events (variables) to be included. For the 2030 Agenda this would be the SDGs or a subset of their 169 targets. In the next step, the interactions between these events are assessed. In the original form of cross-impact analysis the assessment was focused on the probability of each event occurring under the influence of all the other events, or checking the coherence of such probability assessments. Today, many variants of cross-impact analysis exist and it belongs to a whole family of methods for analysing and modeling systems that sit between empirical data-driven computational models and argumentative systems analysis (Mariconda & Lurati, 2015; Panula-Ontto et al., 2018). The exact question in focus has been modified to meet different needs and not all cross-impact analyses use a probabilistic approach (Weimer-Jehle, 2006).

With our perspective on policy coherence, a key strength of cross-impact analysis in the context of 2030 Agenda implementation is how it pragmatically strikes a balance between argumentative/verbal analysis that is important for the cognitive aspects of policy change, and computational support that allows for assessment of multiple interactions that would be too complex for most human minds (Panula-Ontto et al., 2018; Weimer-Jehle, 2006). Commonly, a group of experts representing the different sectors of the included events estimate the interactions in the assessment (Gordon, 1994). While these experts can focus on just parts of the system and on its conceptual and argumentative foundations, their input provides all the data needed for calculating dynamics of the system that may not be obvious at first. This

way it effectively breaks down system aspects in a way that avoids decision-makers being overwhelmed by complexity and yet goes far in terms of systemic analysis (Panula-Ontto et al., 2018).

By generating a level of consensus among decision-makers on complex policy questions, while also moving beyond argumentative analysis in a decision situation where empirical data is lacking and quantification difficult (Panula-Ontto et al., 2018), the approach is valuable in the input stage of policy-making for 2030 Agenda implementation where there is no scientific consensus on how targets interact in a particular context and several targets still lack appropriate indicators.

One example of applying cross-impact analysis to 2030 Agenda implementation (see Weitz et al., 2018) combines a qualitative interactions assessment facilitated through cross-sectoral dialogues and quantitative network analysis in order to single out the most important information for strategic decision-making with regard to target interactions and achieving the SDGs. This includes identification of critical trade-offs and synergies in progress towards the different SDG targets, how they interact and what are leverage points for progressing on the whole set of targets. Based on this, policy can focus on those leverage points that create synergies, and on mitigating the trade-offs. The cross-sectoral dialogues involving experts from e.g., different ministries, specialized agencies, government coordination bodies and interest groups, are central to the approach and bring value in terms of the cognitive factors of policy change discussed earlier, including influencing the knowledge and perception of decision-makers. For example, the approach provides structure and a common language about interactions that can support a collective understanding about how they can be understood conceptually and what they imply in a specific context. This can help to facilitate greater understanding for the perspectives of other stakeholders, build consensus, and strengthen acceptance and ownership of policy outputs and outcomes.

Systems thinking and cross-impact analysis have the potential to strengthen the input stage of policy-making in a way that is needed to respond to the reinforced challenge of governing trade-offs in the era of the 2030 Agenda—both in terms of improving the information base but also in equipping policy-makers with the understanding, knowledge and social relations that can pave the way for better governance of trade-offs throughout all stages of policy-making.

4. Addressing Trade-Offs and Building Coherence in the Policy Process

Moving to the treatment of trade-offs in the process stage of policy-making, ensuring more integrated policy processes has been a recurring theme, in particular in European policy-making, since at least the late 1980s. With provisions made in the treaties of Amsterdam (1997) and of Maastricht (1992), it is fair to say that "integrated policy-making" even has constitutional backing in the EU. The motivation was the insight that environmental problems can only be effectively addressed by the sectors that drive and cause them. The process of ensuring such integration then became complicated because those sectors, such as energy, industry and agriculture, are not causing environmental damages for the hell of it, but because they usually consider it a trade-off worth tolerating—in the name of e.g., productivity, competitiveness, growth or jobs. The inevitable backlash was then that the pursuit of integration in order to better deal with those trade-offs could lead to dilution of environmental objectives instead of sectors taking ownership and integrating them into their strategic orientations (Nilsson & Persson, 2003)

It is possible to distinguish between two different ambition levels—one which seeks coherence in terms of merely avoiding trade-offs, or in other words ensuring policy consistency (Den Hertog & Stroß, 2011); and a more ambitious level which looks for policy coherence that allows synergistic solutions that drive towards common objectives across different policy domains. In an earlier branch of policy-analytic literature, on policy coordination, this differentiation was also known as negative coordination vs positive coordination (Scharpf, 1994).

Different perspectives—and associated integration strategies—can be applied. The political perspective characterizes a political system predominantly in terms of conflict, competition for resources, and struggles between different interest groups, and whereby political actors mediate by taking into account lobbying input from different sectors and interests. With a political perspective, coherence and integration require interventions into the incentives and power balances between actors in the system.

The institutional perspective characterizes policy-making as a governance machinery that contains separated entities ("siloes"), and that organizational instruments, procedural arrangements and institutional reforms can be applied towards increasing the connectivity—at both strategic and operational levels of government.

The cognitive perspective characterizes policy-making processes as being embedded in cognitive "frames," i.e., cognitive structures or sets of ideas about how the world works, which structure thinking in the processes. The presence of alternative frames in different sectors which compete with each other is indeed a powerful part of the political science understanding of policy-making (Schön & Rein, 1994). With the cognitive perspective, integration and coherence efforts turn to strategies to connect different frames and to promote learning and evolution of them, either through sudden or gradual external shocks, or through accumulation of evidence and knowledge pertinent to the issue at hand (Nilsson, 2005)

In reality, instruments for enhancing integration in the process have been tested, building on all three

perspectives, and government bureaucracies now have more than two decades of experience in terms of such efforts. They entail things like national plans and strategies (such as policy coherence for development); obligations to develop strategies and report on cross-cutting priorities and mainstreaming; internal think-tank functions within central government; amalgamation of government ministries; coherence units at the "centre of government" (the Office of the Prime Minister or President); and interdepartmental working groups (Jacob & Volkery, 2004).

While these types of institutional fix can have some positive effect, ultimately, dealing with trade-offs between sectors remains a fundamentally political process which requires negotiation among actors with different goals. Such negotiations often lead to biased or unexpected results due to unequal distribution of power, voice, access to information, and resources and capacities between different actors (Perrone & Hornberger, 2014).

In the era of the 2030 Agenda, the coherence and trade-off challenge in the process stage takes on a new form. Lessons from institutional arrangements amenable to promoting environmental policy integration appear relevant also for governing trade-offs in the 2030 Agenda, bearing in mind that the challenge is not to manage trade-offs between two policy sectors, but to treat priorities within all policy sectors as an "indivisible whole." As the process moves from sectoral departments to the centre of government, it is necessary to gain a comprehensive view. However, "breaking down the silos," a slogan often invoked in the 2030 Agenda discourse, is likely a dangerous strategy. As argued in the input stage section above, sectoral expertise is necessary to build coherent policies (Nilsson & Persson, 2017).

What are required instead are institutional reforms that enhance foresight, communication and collaboration across departments. The process likely requires oversight and ownership at the centre of government, but also mobilization and leadership from those ministries that have traditionally been most powerful, such as the Ministry for Finance (Nilsson & Persson, 2017).

Existing ways to deal with trade-offs have become institutionalized through different, and often quite effective, policy mechanisms. Impetus to change these mechanisms will tend to meet resistance. This is not only about not wanting to change; more systemic focus on coherence and trade-offs comes at a cost, since more fully coherent approaches (Nilsson & Persson, 2017):

- Can be difficult to sell to the public and to media, as they tend to have longer payback cycles (that do not resonate well with political, including election, cycles);
- Can be at odds with internal accountability and performance evaluation systems;
- Can be at odds with bureaucratic routines and standard operating procedures.

However, it is worth noting that while reforming government processes might face several barriers, another driver for integration might come from the outside world. Indeed, the 2030 Agenda explicitly expects actors outside government, including the private sector and civil society, to engage in its implementation. Early experiences with the internalization of the agenda into the private sector suggest that it is met with far more interest and commitment than, for example, previous specific environmental and social protection agendas. Previously defensive industries are becoming much more proactive and are buying in to the 2030 Agenda at a strategic level. Thus, policy integration will get additional drive from a multi-stakeholder engagement approach where government officials engage more with societal stakeholders, in terms of both designing implementation instruments and following up on progress and results.

Concrete mechanisms for policy consultation have been in place for decades. What would be required is a more ambitious deliberative process which covers a wider set of policy issues, including problem identification, objective setting, development of options, and evaluation of those options in terms of impacts on and consequences for different policy priorities.

5. Addressing Trade-Offs and Building Coherence in Policy Outputs

While there is value in process, what matters ultimately is the coherence of the generated policy outputs, and ultimately the outcomes: changes in the behaviour, practices and choices of different actors in society. Ensuring more coherent outputs requires some form of standard that can inform or induce the design of policies so that trade-offs can be identified, addressed, and mitigated as far as possible. The most established and institutionalized form for this is impact assessment, which since the 1970s has become a significant field of professional practice as well as of research (Fischer & Montaño, 2019).

Most governments have, at least on article, some form of mandatory impact assessment approach. Commonly, these impact assessments concern the prediction of economic, social and environmental consequences of draft policy proposals, either economy-wide or in specific sectors. In some places, the focus is on the impacts in terms of regulatory burden (so-called Regulatory Impact Assessment; Hertin, Jacob, Pesch, & Pacchi, 2009); in others there is a stronger focus on environmental and/or social impacts (Environmental Impact Assessment; Social Impact Assessment; Becker, 2001).

Different forms of impact assessment use different methods. These methods have critical limitations and may overlook important dimensions or interactions, in particular when looking beyond the short term. Issues that tend to be neglected include dynamic or structural effects, the existence of thresholds, non-linear effects, or irreversible changes (Lade, Tavoni, Levin, & Schlüter, 2013). Furthermore, issues that are difficult to quantify

or model (e.g., quality of education, or empowerment of women) tend to be neglected. As Peter Drucker put it, "what gets measured gets managed" (Drucker, 1954).

The practices of impact assessment fundamentally differ between different communities and jurisdictions (Pope, Bond, Morrison-Saunders, & Retief, 2013). In some jurisdictions, such as with the EU, impact assessments used by the European Commission are mostly model-based technical studies. In others, such as Sweden, qualitative assessments and reasoning dominate. Ambitious efforts to include stakeholders in the assessment process through deliberative methods are rare.

The theory and practice of impact assessment has, despite many years of development, not strengthened its role as an instrument for governing policy coherence. The 2030 Agenda presents an opportunity to revamp it. By making the 2030 Agenda the starting point for impact assessments, governments can achieve a framework with strong international legitimacy and relatively comprehensive coverage of societal priorities in a systematic way.

In a revamped impact assessment framework, the 17 SDGs can form key impact categories, but they will need to be both condensed and interpreted in the context of the proposed policy intervention. The interpretation also depends on the political priorities and agendas in the jurisdiction in question. For the EU context, for example, we suggest the following parameters could be relevant under each SDG (depending ultimately on the policy intervention):

SDG 1—Impact on incomes of low-income and vulnerable groups;

SDG 2—Impacts on food security (national or local supply chains), on nutrition, and on environmental sustainability of agriculture;

SDG 3—Impacts on disease prevalence, and on lifestyles through changes in access to physical activity or nutrition;

SDG 4—Impact on school performance;

SDG 5—Impacts on equal opportunities and on equal treatment of men and women;

SDG 6—Impact on water quality and quantity;

SDG 7—Impacts on energy consumption and on security of supply;

SDG 8—Impacts on employment, on economic growth and on competitiveness;

SDG 9—Impacts on industry, on small and medium-sized enterprises, and on regulatory burden;

SDG 10—Impact on distribution of income and social equality, including regional effects;

SDG 11—Impacts on urban quality of life, inclusion, segregation and safety;

SDG 12—Impacts on natural resource use, on emissions of pollution, and on chemicals use;

SDG 13—Impacts on climate resilience and on greenhouse gas emissions;

SDG 14—Impacts on pollution of oceans and on ocean resources;

SDG 15—Impacts on biodiversity and on functioning of ecosystems;

SDG 16—Impacts on criminal activity, on local governance systems, and on inclusion of citizens in decision-making;

SDG 17—Impacts on developing countries and on international trade.

Clearly, many of these aspects are already treated today in existing frameworks. However, applying such a new SDG-based impact assessment framework will require development of methods. In many OECD countries, data will be available for a baseline, but the analytical toolbox to simulate impacts across all fields is not yet sufficient. For example, despite decades of effort in building comprehensive simulation and assessment models, we are largely unable to predict patterns of systemic change in society in areas such as climate mitigation policy (Pindyck, 2013).

There are international efforts to develop new methods and approaches in integrated assessment that can provide a more coherent or comprehensive view of development trajectories across the SDGs. The models that exist are highly complex and suffer from not having resolution at national scale. Another common problem is a lack of transparency which limits the possibility for the users of the result to interpret what the models suggest. Finally, there is deep scientific uncertainty about the systems studied, although progress is being made continuously (Weyant, 2017). Thus, we conclude that the state-of-the-art is such that the integrated assessment models will not be usable as impact-assessment tools for more coherent policy-making at national level in the near term.

Given that setting benchmarks is a highly complex and uncertain—and politicized—process, and that assumptions and projections into the future about impact chains add to the uncertainty, it must be recognized that impact assessment is fraught with challenges. The actual outcome of any implemented policy instrument can never be known with any degree of certainty. In reality, policy-making to manage trade-offs is not a one-off event, but rather a sequential decision-making process under deep uncertainty (Weyant, 2008). Assumptions need to be made regarding the way in which the policy will operate and what impacts it will have on behavior under different conditions within the larger political, economic and social context; how it will interact with other policies through causal relations; or the ways in which it will be adopted and implemented by different actors. Furthermore, its rationalistic assumptions about actors' responses to a policy change often run counter to the political realities.

It is not feasible to generate quantitative impact predictions for all 17 SDGs, much less for all 169 targets, in a policy impact assessment. However, it is possible to establish an impact assessment framework which enables qualitative assessments along all 17 dimensions. To a great degree, that assessment can draw on the in-

teractions assessment that was carried out in the input stage. It can also benefit greatly from continuing the deliberative input with multiple stakeholder within and outside government who contribute to the assessment. When deemed relevant and critical (as a result of identifying hotspots or because it is a political priority), deeper quantitative analysis, including with specific modelling or with statistical evidence, can be carried out for specific impacts.

6. Conclusions

This article suggests that lessons on and approaches to more coherent policy-making and policy analysis can be deployed to deal more effectively with trade-offs in political life. The mechanisms that they provide are useful at the input, process and output stage of the policy process. The 2030 Agenda does not fundamentally change the dynamic of trade-offs in politics, but with its broad scope, numerous interactions, and guiding principles of universality, integration and transformative change, it presents far greater challenges than past development agendas. It should prompt policy-makers and analysts to sharpen their tools, and generates demand for a more stringent and systematic approach and "governance infrastructure" that can address trade-offs, running through the entire policy process.

We have discussed the treatment of trade-offs in the input, process and output stages of policy-making. In the process and output stages, policy integration mechanisms and impact assessment mechanisms have been tested, used and abused by decision-makers for decades, whereas the proposed interactions assessment in the input stage is more unexplored territory. We see this as a critical addition, one which not only generates much-needed knowledge for policy-makers around the character of trade-offs that will need managing, but also paves the way for more effective approaches in the latter two stages.

An analytical-deliberative approach appears not only useful but essential in order to manage trade-offs and build coherence. It is not only that a broad range of stakeholders have a legitimate claim to be given a voice, and that involving them will generate better decisions, but also it reflects the fundamental premise that there is no single true, objective understanding of a policy problem that can be discovered through analytical work. Even with the greatest scientific rigour applied, the results of analytical work will inevitably reflect the biases of the participating bodies (Kurze & Lenschow, 2018).

This is, therefore, our final message: Managing policy trade-offs cannot be done solely through science and technical expertise; to facilitate policy change, stakeholders must drive the input of knowledge, perspectives and values at all of the three stages of policy formation. This also means making the most of existing knowledge in the current political context and institutional landscape.

Conflict of Interests

The authors declare no conflict of interests.

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